

**Board of Forestry and Fire Protection  
Title 14 of the California Code of Regulations**

[Notice Published July 24, 2009]

**45 day re-notice per GC 11346.8 (c)**

**MODIFICATIONS TO TEXT OF PROPOSED REGULATION AND  
PUBLIC HEARING DATE**

**Anadromous Salmonid Protection Rules, 2009  
(previously named Threatened or Impaired Watershed Rules, 2009)**

**PUBLIC HEARING DATE**

Pursuant to the requirements of Government Code § 11346.8(c), and Title 1 of the California Code of Regulations § 44, the State Board of Forestry and Fire Protection (Board) is providing notice of changes made to proposed regulations listed below which were the subject of a regulatory hearing on June 24, 2009. The Board will hold a public hearing to consider adoption of final rule language. The public hearing is to be held 8:00 a.m. on Wednesday September 9, 2009, at the Hyatt Regency Sacramento, 1209 L Street, Sacramento, California.

**MODIFICATIONS TO TEXT OF PROPOSED REGULATION**

The Board is providing notice of changes made to the proposed regulations affecting:

§ 895	Abbreviations Applicable Throughout the Chapter.
§ 895.1	Definitions.
§ 898	Feasibility Alternatives.
§ 914.8 [934.8, 954.8]	Tractor Road Watercourse Crossing.
§ 916.5 [936.5, 956.5]	Procedure for Determining Watercourse and Lake Protection Zone (WLPZ) Widths and Protective Measures
§ 916 [936, 956]	Intent of Watercourse and Lake Protection.
§ 916.2 [936.2, 956.2]	Protection of the Beneficial Uses of Water and Riparian Functions.
§ 916.9 [936.9, 956.9]	Protection and Restoration in Watersheds with Threatened or Impaired Values.
§ 916.11 [936.11, 956.11]	Effectiveness and Implementation Monitoring.
§ 916.12 [936.12, 956.12]	Section 303(d) Listed Watersheds.
§ 923.3 [943.3, 963.3]	Watercourse Crossings.
§ 923.9 [943.9, 963.9]	Roads and Landings in Watersheds with Threatened or Impaired Values.
§ 916.9.1 [936.9.1]	Protection Measure in Watersheds with Coho Salmon.
§ 916.9.2 [936.9.2]	Measures to Facilitate incidental Take Authorization in Watersheds with Coho Salmon.
§ 923.9.1 [943.9.1]	Measures for Roads and Landings in Watersheds with Coho Salmon.

## PUBLIC COMMENTS

At the hearing, any person may present statements or arguments, orally or in writing, relevant to the proposed action described in this 45-Day Notice. The Board requests, but does not require, that persons who make oral comments at the hearing also submit a summary of their statements. Additionally, pursuant to Government Code § 11125.1, any information presented to the Board during the open hearing in connection with a matter subject to discussion or consideration becomes part of the public record. Such information shall be retained by the Board and shall be made available upon request.

## WRITTEN COMMENT PERIOD

Any person, or authorized representative, may submit written comments relevant to the proposed regulatory action to the Board. **The written comment period ends at 5:00 P.M., on Monday September 7, 2009.** The Board will consider only written comments received at the Regulations Coordinator Office by that time (in addition to those comments received at the public hearing). The Board requests, but does not require, that persons who submit written comments to the Board reference the title of the rulemaking proposal in their comments to facilitate review.

Written comments may be submitted by U.S. mail to the following address:

Board of Forestry and Fire Protection  
Attn: Christopher Zimny  
Regulations Coordinator  
P.O. Box 944246  
Sacramento, CA 94244-2460

Written comments can also be hand delivered or sent by courier to the contact person listed in this notice at the following address:

Board of Forestry and Fire Protection  
Room 1506-14  
1416 9<sup>th</sup> Street  
Sacramento, CA

Written comments may also be sent to the Board via facsimile at the following phone number:

(916) 653-0989

Written comments may also be delivered via e-mail at the following address:

[board.public.comments@fire.ca.gov](mailto:board.public.comments@fire.ca.gov)

## **UPDATED INFORMATIVE DIGEST/POLICY STATEMENT OVERVIEW**

The Board held a public hearing on June 24, 2009 to provide the public an opportunity to comment on this regulation. During this hearing, the Board received comments from the public both in writing and in testimony. The Board considered all written and oral comments brought before it. The Board discussed the comments received and determined they wished to amend some of the proposed rules offered at the hearing. The Board directed staff at the July 8, 2009 hearing to provide potential changes to final regulatory language to the public in a 45-day notice pursuant to GC § 11346.8(c). The Board may adopt any one individual proposed change, a selected group of the proposed changes, or all of the proposed changes. The means of identifying the proposed changes are below:

### **MODIFICATIONS TO TEXT OF PROPOSED REGULATION**

#### **14 CCR § 895. Abbreviations Applicable Throughout Chapter.**

##### **WTL**

The abbreviation “WTL” used throughout the initial proposed text has typographical errors. The abbreviation is incorrectly represented as “WLT” on page 59, line 17; (14 CCR § 916.9 [936.9, 956.9, subsection (h)(1); in figures 4, 5, 6 of 14 CCR § 916.9 [936.9, 956.9, subsection (f)(2),(3), and (5) (ref. pp. 32, 40, 48 of initial ); and figure 7 in 14 CCR § 916.9 [936.9, 956.9, subsection (g) (ref. pp. 58 of the initial text.). The proposed amendment corrects the abbreviation to “WTL”.

##### **ACD**

The abbreviation “ACD” (ref. p.2, line 3, Optional Amendment 1 of initial proposed text) was deleted. The Board determined this abbreviation was not necessary as the Board deleted the use of the term in the proposed regulation. The Board found that relying on a measurement of angular canopy density creates another measurement requiring landowners and agencies to purchase equipment and provide training at an additional cost. The Board found that adoption of regulations that rely on a measurement of angular canopy density will not be necessary if the Board adopts adequate canopy retention standards throughout the core and inner zone.

#### **Changes to 14 CCR § 895.1. Definitions.**

##### **Angular Canopy Density**

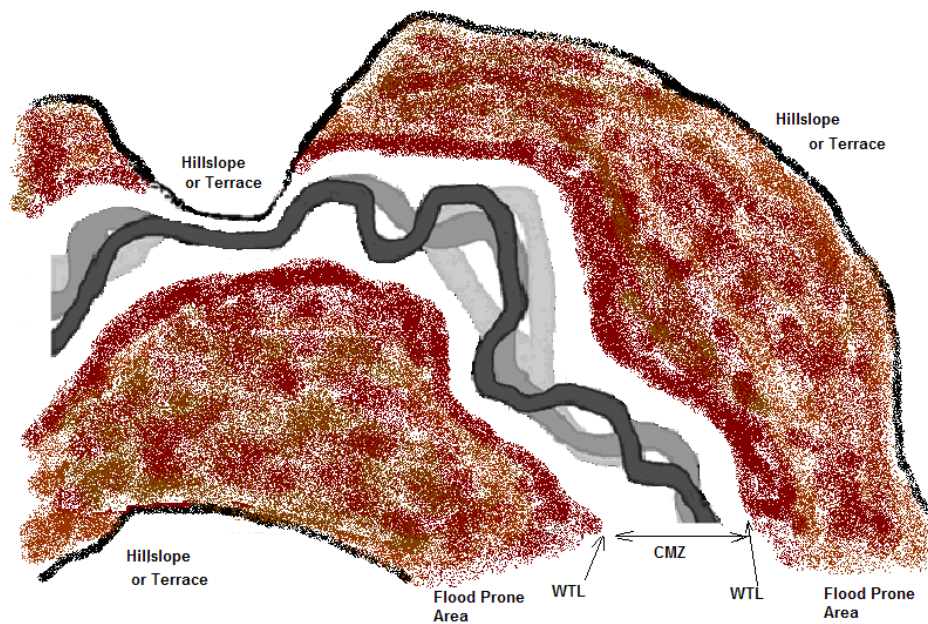
The definition for angular canopy density (Optional Amendment 2, ref. p.3, lines 3-12 of the initial proposed text) was deleted. The Board does not support the use of angular canopy density as a measure of adequate protection for any riparian function other than stream temperature. Implementation and standardization of angular canopy density as a metric of properly functioning salmonid habitat, although more directly applicable to stream temperature than other metrics, would be problematic and confusing for

regulators and foresters. Furthermore, there is no information or data relating angular canopy density to tree density or as a potential surrogate metric for tree density and thus LWD recruitment.

### **Channel Migration Zone**

The Board amended the definition for channel migration zone (CMZ) and replaced the proposed definition and Figure 1 with the amended definition and Figure 1 below. The amendment clarifies and corrects the relationship of the 80-year design life to the CMZ delineation. The replacement Figure 1 eliminates confusing dashed lines at the edge of the channel margins to better represent the zone within which channels may migrate. Further the amendment relating the 80-year design life to the CMZ delineation makes the definition more useful and clarifies the intent of the definition for use in delineating the CMZ. The revision allows the definition to be applied in a predictive manner to encompass changes in the river landscape over time. The definition should recognize that the presence of a channel migration zone helps to assure that natural fluvial processes of erosion and deposition are accommodated over time and that riparian responses to such natural disturbance are part of the desired ecological diversity and health of the river landscape.

**Channel Migration Zone** means the area where the main channel of a watercourse can reasonably be expected to shift position on its floodplain laterally through avulsion or lateral erosion during the period of time required to grow forest trees from the surrounding area to a mature size, except as modified by a permanent levee or dike. The result may be the loss of beneficial functions of the riparian zone or riparian habitat (see Figure 1).



### Flood flow

The Board amended the definition to clarify the role local experience has in modifying the estimate of flood flows. The Board found that local experience, while important in informing decisions based on site-specific conditions, should not be directly relied upon for objective, supportable flood flow estimates. Such reliance reduces the credibility and defensibility of the estimate. However, local experience can enhance direct channel cross-section measurements. The amended text is as shown below. The initial public notice on May 8, 2009, incorrectly did not show the entire definition in underscore format, as the definition is a new regulatory definition proposed by the Board. The single underscore format is added to correct the oversight in the initial notice.

**Flood flow** means that magnitude of peak flow that would, on the average, be equaled or exceeded once every specified period of years (e.g., once every 10 year, 50 years, 100 years). This flow shall be estimated by flood flow measurement records and ~~relationships~~ by empirical relationships between precipitation, watershed characteristics, and runoff, and may be modified by direct channel cross-section measurements informed by ~~and~~ local experience.

### **Flood Prone Area**

The Board made amendments to the definition for flood prone area to further clarify the group of field indicators specified to determine the flood prone area (see below). The indicators include deposits of fine-grained sediment “on the bark of hardwoods and conifers” and the clarification on use of the 20 year flood reoccurrence location. Also, a sentence is added to clarify field delineation of a channel migration zone and a flood prone area, as these features often have similar physical characteristics. Precedence for delineating a channel migration zone is given over the delineation of a flood prone area. This precedence results in providing more conservative riparian function protection measures, as the channel migration zone prescriptive standards generally exclude timber operations.

**Flood Prone Area** means an area contiguous to a watercourse channel zone that is periodically flooded by overbank flow. Indicators of flood prone areas may include diverse fluvial landforms, such as overflow side channels or oxbow lakes, hydric vegetation, and deposits of fine-grained sediment between duff layers or on the bark of hardwoods and conifers. The outer boundary of the flood prone area may be determined by field indicators such as the location where valley slope begins (i.e., where there is a substantial percent change in slope, including terraces, the toes of the alluvial fan, etc.), a distinct change in soil/plant characteristics, and the absence of silt lines on trees and residual evidence of floatable debris caught in brush or trees. Along laterally stable watercourses lacking a channel migration zone ~~Where~~ the outer boundary of the flood prone area cannot be clearly determined using the field indicators above, it shall be determined based on the area inundated by a 20-year recurrence interval flood flow event, or the elevation equivalent to twice the distance between a thalweg riffle crest and the depth of the channel at bankfull stage. When both a channel migration zone and flood prone area are present, the boundaries established by the channel migration zone supersedes the establishment of a flood prone area.

### **Fluvial, Hydric and Hydrologic Disconnection**

The Board added the definitions Fluvial, Hydric and Hydrologic Disconnection to clarify terms used in the definition of “Flood Prone Area” in 14 CCR § 895.1.

The definition for “Hydrologic Disconnection” is currently applicable only in watersheds with coho salmon, but the Board determined it is applicable to all areas of the State. Board is proposing a revision to 14 CCR § 916.9 [936.9, 956.9], subsection (k)(2) and those revisions include use of the term “Hydrologic Disconnection” regarding year-round road use limitations. It is necessary to clearly define this term for application throughout the State in order to ensure consistent application of road and landing use to prevent transport of sediment into a fish bearing watercourse.

### **Lake Transition Line**

The Board made additional minor change to the definition of “Lake Transition Line” that will make this definition consistent with the definition of the term “Riparian”, which is already defined by the Board. The Board changed the word “riparian” to “mesic” on page 6, line 5 of the initial proposal.

**Lake Transition Line** means that line closest to the lake where riparian mesic vegetation is permanently established.

### **Pre-existing Large Wood**

The Board added the following new definition for pre-existing large wood to clarify the Class III down-wood retention standard proposed in 14 CCR § 916.9 [936.9, 956.9], subsection (h)(2). This definition is in common usage and is contained in DFG’s California Salmonid Stream Habitat Restoration Manual, 3<sup>rd</sup> edition (Flosi 1998).

**Pre-existing Large Wood** means, for Class III watercourses in watersheds with listed anadromous salmonids:

(a) a log or tree segment that is (i) at least 12 inches or greater in diameter outside bark when measured at the small end, (ii) at least six feet in length, (iii) in contact with the ground, and (iv) present prior to timber operations.

(b) a root wad that is (i) at least 12 inches or greater in diameter outside bark when measured at the base of the trunk, (ii) in contact with the ground, and (iii) present prior to timber operations.

### **Properly Functioning Salmonid Habitat**

The Board amended the proposed definition replaced the word “lifecycle” on page 6, line 10 of the initial proposed text with “life-history”. Life-history is the accepted terminology in biology disciplines for referring to the reproductive cycle of any organism. Life-history stages of salmonids can and do show considerable temporal and spatial variability under specific geomorphic conditions (Bjornn and Reiser 1991; Hicks et al.

1991). The definition acknowledges that the conditions for salmonids would also vary based on specific geomorphic conditions and spatial and temporal variability.

### **Riparian Associated Species**

The Board amended the definition with some minor changes for clarity and consistency. The language “at least one critical life stage” was replaced with “any life-history stage” on page 6, line 15-17 of the initial proposal. All life-history stages are considered to be critical for species to complete their reproductive cycles and persist, so no one stage is more critical than another. This change clarifies the language and understanding of the definition, reduces confusion about whether a life-history stage is critical or not, or whether or not a particular life-history stage should be considered under the definition.

**Riparian-Associated Species** means those plant, invertebrate, amphibian, reptile, fish, or terrestrial wildlife species that require utilization of the riparian zones areas during any life history stage at least one critical life stage.

### **Saturated soil conditions**

The Board amended language to recognize the difference between native surfaced roads or landings and roads or landings that are surfaced with rock or gravel, for example. Additionally, minor changes have been suggested for clarity as presented in the text below.

**Saturated soil conditions** means that ~~site conditions are sufficiently wet that timber operations displace soils in yarding or mechanical site preparation areas or displace road and landing surface materials in amounts sufficient to cause a turbidity increase in drainage facilities that discharge into Class I, II, III, or IV waters, or in downstream Class I, II, III, or IV waters that is visible or would violate applicable water quality requirements.~~

~~In yarding and site preparation areas, this condition may be evidenced by:~~  
~~a) reduced traction by equipment as indicated by spinning or churning of wheels or tracks in excess of~~  
~~normal performance, b) inadequate traction without blading wet soil, c)~~  
~~soil displacement in amounts that cause visible increase in turbidity of the downstream waters in a receiving Class I, II, III, or IV waters, or in amounts sufficient to cause a turbidity increase in drainage facilities that~~



~~discharge into Class I, II, III, or IV waters, or d) creation of ruts greater than would be normal following a light rainfall.~~

~~On logging roads and landing surfaces, this condition may be evidenced by a) reduced traction by equipment as indicated by spinning or churning of wheels or tracks in excess of normal performance, b) inadequate traction without blading wet soil, c) soil displacement in amounts that cause visible increase in turbidity of the downstream waters in receiving Class I, II, III, or IV waters, or in amounts sufficient to cause a turbidity increase in drainage facilities that discharge into Class I, II, III, or IV waters, d) pumping of road surface materials by traffic, or e) creation of ruts greater than would be created by traffic following normal road watering, which transports surface material to a drainage facility that discharges directly into a watercourse. The Soils or road and landing surfaces that are hard frozen are excluded from this definition. all soil and/or surface material pore spaces are filled with water to such an extent that and runoff is likely to occur. Indicators of saturated soil conditions may include, but are not limited to: (1) areas of ponded water, (2) pumping of fines from the soil or road surfacing material during timber operations, (3) loss of bearing strength resulting in the deflection of soil or road surfaces under a load, such as the creation of wheel ruts, (4) spinning or churning of wheels or tracks that produces a wet slurry, or (5) inadequate traction without blading wet soil or surfacing materials.~~

### **Stable operating surface**

The Board deleted Optional Amendment 3. Optional Amendment 3 reference to “large ponds” in the road is both unlikely to occur and difficult to enforce. Most important are retaining the performance criteria and prevention measures, either in the definition or in the relevant rule subsections, that promote hydrologic disconnection from watercourses.

### **Stressing Storm**

The Board deleted the term as it was only used in Optional Amendment 30 (ref 14 CCR 923.9) which was also deleted.

### **Thalweg Riffle Crest**

The Board added the following new definition for thalweg riffle crest to clarify terms used in the definition of flood prone area in 14 CCR 895.1. This definition is taken from the Montana Department of Environmental Quality (2007) manual *Longitudinal Field Methodology For The Assessment Of TMDL Sediment And Habitat Impairments*.

Thalweg riffle crest means the upstream end of a riffle feature and can be identified as the area where the surface water flow changes from smooth to turbulent. The thalweg is found at the deepest part of the channel. Where the thalweg is measured in a pool, the riffle crest is a high point on a longitudinal profile and the shallowest place at the downstream end of a pool.

### **Watercourse Transition Line**

The Board amended the definitions for non substantive grammatical corrections. Added are the word 'a' between 'without' and 'CMZ' on page 9, line 17, and adding a comma after "undercut banks" to correct a typo on page 9, line 20 of the initial proposal.

Watercourse Transition Line (a) for a watercourse without a CMZ, means the line defined by one or more the following features: 1) a change of vegetation from bare surfaces or annual water tolerant species to perennial water tolerant or upland species at least 25 years in age at breast height, 2) physical indicators of scour such as undercut banks, moss lines on rocks, the top of exposed roots along the channels, and 3) a change in the size distribution of surface sediments from gravel to fine sand.

Figure 3A was amended to more accurately depict that the WTL lies between the area where annual and perennial riparian vegetation occurs. The diagram shows salmonberry occurring below the WTL, which implies it is annual, but it is perennial. The amendment modified Figure 3A on page 10 of the initial plead to show salmonberry at or above the WTL. As shown in the accompanying plead text, the initial figure is deleted and replace with a new Figure 3A.

### **Watersheds in the Coho salmon ESU**

The Board amended this definition to reduce confusion and address additional coastal watersheds containing listed salmonids. The following amendments were made:

1. Change the name of the geographic location in the definition to ""Watersheds in the Coastal Anadromy Zone";

2. Revise the text in the definition to add reference to the SCCC steelhead Distinct Population Segment (DPS); and,
3. Revise all text in the rule proposal which references the “coho salmon ESU” with “Watersheds in the Coastal Anadromy Zone”.

**Watersheds in the ~~coho salmon ESU~~ Coastal Anadromy Zone** means any planning watershed(s) in the ~~coho salmon (Oncorhynchus kisutch) Evolutionary Significant Units (ESU), Central California Coast coho salmon Evolutionary Significant Units (ESU), South Central Steelhead Distinct Population Segment (DPS), Central California Coast steelhead DPS, Northern California steelhead DPS, California Coastal Chinook salmon ESU, and Southern Oregon/Northern California Coast coho salmon ESU,~~ as defined in 70 Federal Register 37160, dated June 28, 2005, where ~~populations of any anadromous salmonids (including central California coast coho, southern Oregon/northern California coast coho, northern California steelhead, central California coast steelhead, and central California coast chinook)~~ that are listed as threatened, endangered, or candidate under the State or Federal Endangered Species Acts are currently present or can be restored. Official maps of ~~coho salmon~~ ESUs and DPSs are found... as published on January 1, 2010.

While the perimeter of the geographic area in the definition includes two coho salmon ESUs, the prescriptive requirements applicable to this geographic area apply to all watersheds with any listed anadromous salmonids, not just to watersheds with listed coho salmon. The geographic location for this definition is intended to include all watersheds where any listed anadromous salmonids, not just coho, are present or restorable. This has produced confusion.

Additionally, the geographic scope in the proposed definition (coho salmon ESU) excludes some coastal watersheds that contain south central California coast (SCCC) steelhead populations that are not within the coho salmon ESU perimeter. As currently proposed, some locations in southern coastal Monterey and San Luis Obispo Counties that contain watersheds with listed SCCC steelhead are subject to the proposed rules for locations “outside the coho ESU”, which are the inland T/I rules. These watersheds would most appropriately be subject to the prescriptive standards for the proposed coho ESU geographic area, the primarily coastal area. Prescriptive rules for locations outside the coho ESU were specifically designed for non coastal areas and therefore are not appropriate for SCCC steelhead species.

## **Winter Period**

The Board deleted the proposed revision to the new winter period date for the T/I watersheds. The change would have imposed a wide range of winter period requirements (such as temporary culvert removal) mandated by the FPRs to a wider period (October 15- May 1) than is currently required (November 15 to April 1). The Board did not intend to modify the recommendation of the Board's Interagency Road Rules Committee to require preparation of a winter operating plan that addresses certain actions for the period of October 15 to May 15 with limitation and guidance stated in 14 CCR § 916.9 [936.9, 956.9], subsections (l) (1) and (2). The Road Rules Committee recommendations were not intended to result in new imposition of activities and additional significant costs to the landowner and operators, but were to reorganize existing requirements in the T/I rules for the wet season period. The changes are shown below.

Winter Period means the period between November 15 to April 1, except ~~4) as noted under special County Rules at 14 CCR, Article 13 § 925.1, 926.18, 927.1, and 965.5. and 2) from October 15 to May 1 in watersheds with listed anadromous salmonids, pursuant to 14 CCR § 916.9 [936.9, 956.9], subsection (l).~~

## **14 CCR § 898. Feasibility Alternatives**

The Board amended the initial proposal to this section by moving the language from 14 CCR § 916.12 [936.12, 956.12]; back to its original location in 14 CCR 898. This initial change as proposed was not consistent with subsections 14 CCR 916.12 [936.12, 956.12] (a) through (e). The existing rules under 14 CCR § 916.12 [936.12, 956.12] provides specific direction to CAL FIRE to work with the various regional waterboards to evaluate watersheds for the need for watershed specific rules to address the beneficial uses of water. The existing language under these subsections is not related to the preparation or review of any individual THP. The language proposed for deletion under 14 CCR § 898 provides direction to an RPF preparing a THP, and specifically relates to cumulative impacts assessment. This is consistent with the remainder of the language under 14 CCR § 898. It was inappropriate and unnecessary to make this change as proposed.

## **14 CCR §§ 916, 936 and 956. Intent of Watercourse and Lake Protection.**

The Board amended the first paragraph of the section with a minor revision necessary to expand the list of intended outcomes resulting from the Watercourse and Lake Protection measures. The additional intended outcome added is related to ' timber operations not resulting in not an unauthorized take of listed aquatic species". This revision is consistent with other requirements in the FPRs.

The purpose of this article is to ensure that timber operations do not potentially cause significant adverse site-specific and cumulative impacts to the beneficial uses of water, native aquatic and riparian-associated species, and the beneficial functions of riparian zones; or result in an unauthorized take of listed aquatic species; are protected from potentially significant adverse site-specific and cumulative impacts associated with timber operations, or threaten to cause violation of any applicable legal requirements. This article also provides protection measures for application in watersheds with listed anadromous salmonids and watersheds listed as water quality limited under Section 303(d) of the Federal Clean Water Act.

The Board amended the second paragraph of the section on page 14, line 16, to make clear that the intent of watercourse and lake protection should apply to all timber operations conducted under plans, exemptions, or emergency notices. These other types of permits were added. Additionally, the Board included the word “employ” rather than “contain”, since exemptions and emergency notices are ministerial documents with standards established related to what these documents “contain”. The changes are shown below:

Further, it is the intent of the Board to clarify and assign responsibility for recognition of potential and existing impacts of timber operations on watercourses and lakes, native aquatic and riparian-associated species, and the beneficial functions of riparian zones and to ensure adoption of all plans, exemptions and emergency notices employ ~~contain~~ feasible measures to effectively achieve compliance with this article.

The Board made amendments to 14 CCR § 916. [936, 956] (b) to include limited restoration as a goal of the FPRs. The intent of the amendment is to specify that restoring habitat shall be a goal but only required to the extent feasible as defined in the FPRs. Timber operations shall actively contribute towards restoration when feasible, but are not expected to achieve complete restoration of habitats or recovery of the species. This change was made on page 15, line 6 of the initially noticed regulation.

Other amendments made in 14 CCR § 916. [936, 956] (b) are related to complying with water quality policy and the waterboards’ interpretation of policy. Requiring timber harvesting operations to comply with waterboard policy implies such policy is statute or regulation, and would result in confusion regarding its application and enforcement. The Board chose not adopt the changes proposed on page 15, lines 8, 9, and 10 regarding waterboard policy and its interpretation.

The Board amended 14 CCR § 916 [936, 956], subsection (b)(1) by deleting the index number for (b)(1) as initially proposed on page 15, line 16, and retained the language on page 15, line 10 related to minimum requirements the LTO must

follow. Without this language, subsection (b)(2) would appear to require the removal of water, trees, and large wood from a watercourse, which is the opposite of the intent of this section. Also the term “flood plain” on page 15, line 17 of the initial proposal is replaced with the term “flood prone area”. This change is consistent with other sections of the rules, utilizing a term defined by the Board in this rulemaking action. These changes are for purposes of regulatory clarity and brevity and are non-substantive in effect.

#### **14 CCR §§ 916.2, 936.2 and 956.2. Protection of Beneficial Uses of Water & Riparian Functions.**

In 14 CCR § 916.2 [936.2, 956.2], subsection (a)(3), the Board amended the initial proposal for a non-substantive grammatical correction to add a space in the code section reference on page 16, line 18.

In 14 CCR § 916.2 [936.2, 956.2], subsection (a), page 16, line 22, the Board amended initial plead language to clarify the Board’s intent to include “restoration” in the FPRs. The intent of the amendment is to specify that restoring habitat shall be a goal, but only required to the extent feasible as defined in the FPRs. Timber operations shall actively contribute towards restoration when feasible, but are not expected to achieve complete restoration of habitats or recovery of the species. The following change is made to 14 CCR § 916.2 [936.2, 956.2], subsection (a),

The maintenance, ~~P~~rotection, and contribution towards restoration of....

In 14 CCR § 916.2 [936.2, 956.2], subsection (c) the Board amended the initial proposal for clarity and consistency with earlier recommendations regarding timber operation contributions toward restoration on page 17, line 11.

Amendments made in this subsection for the concepts of “necessary and sufficient” on page 17, line 12. These terms are addressed under 14 CCR § 916.6 [936.6, 956.6] and are therefore not necessary to repeat here.

Amendments to in this subsection add the language “set forth in 14 CCR § 916.5 [936.5, 956.5] Table 1” after the phrase “beneficial uses” on page 17, line 11. This will provide the same parallel intent and specificity as found in subsection (b), which also references 14 CCR § 916.5, Table 1 for characteristics and beneficial uses.

Amendments deleted language on page 17, lines 15 and 16. This language, related to limitations on restoration goal, is unnecessary and redundant given the changes made regarding restoration on page 17, line 11.

The above amendments to subsection (c) are shown below:

**(c)** When the protective measures contained in 14 CCR §§ 916.5 [936.5,

~~956.5], and 916.9 [936.9, 956.9] when the plan is in a planning watershed with listed anadromous salmonids, are not adequate to provide for maintenance, protection or to contribute towards restoration to of beneficial uses of water set forth in 14 CCR § 916.5 [936.5, 956.5] Table 1, feasible additional measures as are necessary and sufficient to achieve these goals shall be developed by the RPF or proposed by the Director under the provisions of 14 CCR § 916.6 [936.6, 956.6], Alternative Watercourse and Lake Protection, and incorporated in the plan when approved by the Director. Additional measures taken to contribute to restoration of beneficial functions of riparian zones are those which are feasible and commensurate to the action in the plan.~~

**14 CCR §§ 916.9, 936.9 and 956.9. Protection and restoration of the beneficial functions of the riparian zone in watersheds with listed anadromous salmonids.**

**14 CCR § 916.9 [936.9, 956.9] Geographic Scope**

The Board amended the initial proposed language on page 19, lines 15-18, of the geographic scope to retain an initial introductory sentence for the section. It further added regulatory clarification stating that rules under this section supersede standard FRPs. This amendment was done to avoid enforcement conflicts between similar requirements in the standard FRPs and those in 14 CCR 916.9 [936.9, 956.9].

The Board amended the initial proposal language on page 19, lines 15-18 of the geographic scope to clearly indicate to all affected parties the area of application of the proposed rules, including additional southern coastal watersheds with listed anadromous salmonids. The amendment primarily deletes the use of the term “coho salmon ESU”, as this term was deleted in the definitions and replaced with a more geographically inclusive area termed the “coastal andromy zone”. Other descriptive language is added listing the types of watercourse locations (i.e. confined, Flood prone area, etc) with specific rules for clarity.

The Board amended language on page 19, lines 19-25 to more clearly communicate and delineate the upstream watersheds locations where the fine sediment road regulations in 14 CCR 916.9 [936.9, 956.9] (k) through (q) apply. The Board added “and contiguous to,” after the word ‘upstream’ on page 19, line 20 to clarify the upstream location of the immediately upstream watershed. This Board also added language to this subsection to clarify that the fine sediment transport rules do not apply to locations where permanent dams attenuate transport of fine sediment. The Board determined that large impoundments of water created by dams typical block down

stream transport of fine sediments and fine sediment rules for these areas would add unnecessary regulations.

In addition to all other district Forest Practice Rules, the following requirements shall apply in any watershed with listed anadromous salmonids. Requirements of this section supersede other sections of the FPRs.

**Geographic scope** - ~~In addition to all other district Forest Practice Rules, the following requirements shall apply in any planning watershed with listed threatened or impaired values anadromous salmonids. When specified in this section, rules pertaining to watersheds in the coho salmon ESU supersede requirements for watersheds with listed anadromous salmonids.~~ Requirements for watershed with listed anadromous salmonids differ depending on the geographic location of the watershed and geomorphic characteristics of the watercourse. Unique requirements for watersheds with listed anadromous salmonids are set forth for 1) watercourses in the coastal anadromy zone with confined channels, 2) watercourses with flood prone areas or channel migration zones, and 3) watercourses with confined channels located outside the coastal anadromy zone.

Watersheds which do not meet the definition of "watersheds with listed anadromous salmonids" are not subject to this section except as follows: The provisions of 14 CCR §§ 916.9 [936.9, 956.9], subsections (k)-(q), 923.3 [943, 963] and 923.9 [943.9, 963.9] also apply to planning watersheds immediately upstream of, and contiguous to, any watershed with listed anadromous salmonids for purposes of reducing significant adverse impacts from transported fine sediment. Projects in other watersheds further upstream that flow into watersheds with listed anadromous salmonids, not otherwise designated above, may be subject to these provisions based on an assessment consistent with cumulative impacts assessment requirements in 14 CCR §§ 898 and 912.9 [932.9, 952.9] and Technical Rule Addendum No. 2, Cumulative Impacts Assessment. These requirements do not apply to upstream watersheds where permanent dams attenuate the transport of fine sediment to downstream watercourses with listed anadromous salmonids.



#### **14 CCR § 916.9 [936.9, 956.9], subsection (a) Goals**

The Board amendments include 1) clarifying the regulatory and policy standards the Board wishes to meet, 2) eliminating references to primary limiting factors from 14 CCR § 916.9 [936.9, 956.9], subsections (a) and (a)(1), and 3) making clear the goal to protect, maintain, and contribute to restoration of listed salmonids and their habitat.

The amendments for clarifying the regulatory and policy standards the Board wishes to meet add the standard “protect, maintain, and contribute to restoration of properly functioning salmonid habitat and listed salmonid species.” This standard was similarly incorporated in this rule proposal in other goal sections of the FPRs (e.g. 14 CCR 916). This amendment was made on page 20, lines 1-2 of the initial proposal.

Other amendments for clarifying the regulatory and policy standards the Board wishes to meet include adding the term “prevent significant”. The Board determined it should be a goal of the rules to prevent adverse effects even if they cannot be readily measured. The amendments were to the initial proposal on page 20, lines 16, 18, and 20, and on page 21, line 14.

The Board amended the subsection to avoid limiting the goals to just addressing primary limiting factors. These amendments were made on page 20, lines 3-12. A limiting factors approach to protecting habitat values is insufficient. The rules should ensure that watershed conditions are maintained within favorable ranges, not just address the “worst case” condition. While a limiting factors approach may be an appropriate method of prioritizing restoration and recovery actions, it is not an appropriate standard for protecting public trust resources from adverse effects. Which particular factors are “primarily limiting” may be difficult to determine and may vary over time and with location. A plan may have substantial adverse effects on a habitat factor which was not “primarily limiting” prior to the operations of the plan.

The Board amended 14 CCR § 916.9 [936.9, 956.9], subsection (a)(4) to clearly extend to any impediment or barrier that may inhibit passage of any life stage of anadromous salmonids. While methods exist to quantify the extent to which a feature may act as a passage barrier for salmonids through changes in flow for different life stages of salmonid species, these measurements are unlikely to be applied during plan review or implementation. As currently written, the rule may be limited to upstream migration by spawning adults. Impediments to the movement of other life stages may also have effects. Impediments to bidirectional (upstream and downstream ) juvenile movement during low flows may inhibit their ability to select preferable habitats.

The Board amended 14 CCR § 916.9 [936.9, 956.9], subsection (a)(5) to be consistent with proposed amendments in 14 CCR § 916.9 [936.9, 956.9], subsection (r), which eliminate references to a water drafting plan. In addition, the goal of the rule should be to avoid adverse effects resulting from stream flow reductions regardless of whether they are measured or conducted under a water drafting plan.

**14 CCR § 916.9 [936.9, 956.9], subsection (b) – Pre-plan adverse cumulative watershed effects**

The Board amended the subsection to correct a single minor grammatical error. Delete “ly” from the word “significantly” on page 21, line 20.

**14 CCR § 916.9 [936.9, 956.9], subsection (c)(2) - Inner Zone**

The Board amended this subsection by replacing the word “pool” with “large number” on page 22, line 9 to be more specific and descriptive about achieving LWD recruitment.

**14 CCR § 916.9 [936.9, 956.9], subsection (c)(3) - Outer Zone**

The Board amended this subsection by eliminating the text “when needed” from page 22, line 18 because this subsection addresses objectives and does not provide guidance on when an outer zone is required or not.

**14 CCR § 916.9 [936.9, 956.9], subsection (c)(4) Class II-Large**

The Board amended the subsection to modify the initial proposed language regarding the type of data to be used to determine flow in the month of July. The amendment uses standard baseline 30-year or greater average precipitation data sets typically available as annual and monthly means, compiled by CAL FIRE, U.S. Geological Survey (USGS), or National Oceanic and Atmospheric Administration (NOAA) (amongst others) to minimize the influence of year to year variability. The initial proposed language for water supply during July of an average hydrologic year would rely on rainfall/runoff relationships derived from a short period of runoff to long-term average precipitation, which may be skewed. For example, if streamflow is measured for a short period during dryer years and then related to long-term average precipitation, the rainfall/runoff relationship will show that average annual runoff is less than it really is for the basin (AMS 2000; Wilson and Moore 1998; Dunne and Leopold 1978; Rantz 1969 and 1972; Cafferata et al. 2004; CDFFP 1990; Waananen and Crippen 1977).

In practice, average annual precipitation for the corresponding basins are estimated using long-term data sets published by CAL FIRE, USGS or NOAA. In 1969, the USGS published a report, *Mean Annual Precipitation in the California Region*. This report was prepared because national precipitation maps did not accurately portray the high spatial variability of precipitation occurring over the variety of terrain found in California. Additionally, the USGS performed a study in 1977, *Magnitude and Frequency of Floods in California*, in which basin-averaged precipitation was determined for approximately 700 drainage basins throughout California where outflow is gauged by the USGS. This 1977 USGS report estimated long-term annual average precipitation for drainage basins based on drainage basin boundaries and isohyetal maps (maps showing areas of equal rainfall).

(4) Class II large watercourses (Class II-L): The primary objective is to maintain, protect or restore the values and functions of Class II-L type watercourses described below. Class II-L type watercourses: (i) can supply water and nutrients to a Class I watercourse during the month of July during ~~on a year of average precipitation and runoff as derived from long-term average precipitation hydrologic year~~ data sets available from CAL FIRE, U.S. Geological Survey, or National Oceanic and Atmospheric Administration (NOAA); (ii) can supply coarse and fine sediment to the Class I channel ~~and during the average hydrologic year~~; and (iii) may be able to supply wood of a size that would function as large wood for the Class I watercourse. Recruitment, delivery and retention of large wood in Class II- L type watercourses is also critical, as large wood increases sediment storage and decreases the rate of sediment transport to fish-bearing Class I watercourses. Other objectives stated in 14 CCR § 916.9 [936.9, 956.9] subsections (c ) (1) and (2) above for the Core Zone and Inner Zone are also desired objectives for Class II-L type watercourses.

#### **14 CCR § 916.9 [936.9, 956.9], subsection (c)(5) – WLPZs in High or Very High Fire Hazard Severity Zones**

The Board amended this subsection by deleting portions and moving portions of the objective reinserted in 14 CCR § 916.9 [936.9, 956.9], subsections (c)(6) and (v)(5). discussed below. The “prescriptive standards are extracted from the objective and moved into 14 CCR § 916.9 [936.9, 956.9], subsection (v), site specific plan, as there will be many complexities in assessing appropriate hazard reduction projects and making consistent the fuel hazard reduction with the other objectives of the riparian areas. The remaining portions of the subsection are moved into 14 CCR § 916.9 [936.9, 956.9], subsection (c)(6), as fire hazard reductions is yet another “habitat improvement” stated under this objective. This would result in the deletion of the entire subsection (c)(5) of this section of the rules.

#### **14 CCR § 916.9 [936.9, 956.9], subsection (c)(6)**

The subsection is amended to re index the section as 14 CCR § 916.9 [936.9, 956.9], subsection (c)(5) to reflect the deletion of a separate subsection for fire hazard reduction.

Amendments were made to page 24, lines 2-5 of the initial proposal to delete items (i) and (ii) as they were found to be confusing and covered elsewhere in the goals sections of 916.9. Additionally, as noted above, the remaining portions of the initially proposed subsection on fire hazard reduction objectives was moved into this subsection as fire hazard reductions is yet another “habitat improvement” stated under this objective. The following changes clarify this objective.

(5) ~~(6)~~ A primary objective for all WLPZs is to implement practices to maintain, protect and contribute to restoration of properly functioning salmonid habitat and repair conditions detrimental to the species' or species' habitat, where: (i) it is demonstrated that adequate bank stability, shading, and wood recruitment will be provided, and (ii) practice(s) proposed are known to address a primary limit on salmonid populations in that portion of a watershed. Practices include, but are not limited to, thinning for increased conifer growth, felling or yarding trees for wood placement in the channel, restoration of conifer deficient areas, management to promote a mix of conifers and hardwoods, abandonment and upgrading of non--functioning or high risk roads, watercourse crossings, tractor roads, and landings, and fuel hazard reduction activities that will reduce fire hazards and stand replacing wildfires which would result in significant adverse effects to salmonid species or riparian habitat.

#### **14 CCR § 916.9 [936.9, 956.9], subsections (e)(1)(A) – (B) Channel Zone Requirements**

The Board amended 14 CCR § 916.9 [936.9, 956.9], subsection (e)(1)(A) to provide DFG oversight for improving salmonid habitat. The subsection adds “written DFG concurrence” rather than DFG review and comment. DFG has statutory responsibility for the state’s fish and wildlife resources and has responsibility for recovery of state listed endangered or threatened species. When habitat improvements for listed salmonids are being planned and approved, DFG must consider whether such improvement plans are consistent with the California Endangered Species Act, species recovery plans, DFG’s salmonid habitat restoration guidelines, and supported by monitoring data. DFG’s responsibility must be given a level of deference beyond having DFG’s comments considered by CAL FIRE. This responsibility requires that proposed habitat restoration for listed salmonids require written concurrence from DFG.

A non-substantive grammatical correction is made on page 25, lines 6 and 7 by changing the ‘period’ after the word utilities to a ‘comma’. Additionally, on lines 2-3

under (1)(B) add “removal and abandonment” of approved crossings, as this is a typical restoration activity that could be approved in channel zones..

**14 CCR § 916.9 [936.9, 956.9], subsection (e)(2)**

A non-substantive clarifying amendment is made on page 25, lines 17-18, of the initial proposal to correct the responsibilities of a supervised designee. The Board supports providing flexibility for the RPF to use a supervised designee to mark trees at the base proposed felling within the channel zone, but the designee would not be responsible for preparing the THP as it is implied that the designee is not and RPF. The sentence is corrected to indicate that the designee may complete the marking but would not be the RPF preparing the plan.

**14 CCR § 916.9 [936.9, 956.9], subsection (f)(1)**

The Board amended the subsection on page 25, line 20, of the initial proposal to clarify and be more accurate regarding identification of “biological characteristics”. The Board’s intention was to limit the following WLPZ requirements solely to fish bearing streams, and not those class I waters used for domestic water sources. To correct this, the following language is incorporated:

For Class I watercourses, ~~based on biological characteristics where fish are always or seasonally present or where fish habitat is restorable,~~ any plan involving timber operations within the WLPZ shall contain the following information:

This revision would address the concerns including:

1. Potential exclusion of fish bearing or restorable fish bearing Class I watercourses that are designated as domestic water supplies (see 14 CCR § 916.5 [936.5, 956.5], Table 1) during THP layout. If such an exclusion occurred, information in the THP that is needed to establish whether the goals and objectives of this section are being met would not be disclosed as required.
2. Foresters generally are not trained as aquatic biologists and are not required to consult with review team agencies regarding biological characteristics of Class I watercourses or the presence of fish during THP layout when initial watercourse delineation occurs. Review team members commonly find misclassified watercourses during PHIs and other field inspections.
3. Current and foreseeable staffing levels are not likely to allow field review of all harvest plans in areas with listed anadromous salmonids where incidental take has not been authorized. This means reviewing agencies cannot be relied upon to discover misclassified watercourses.

#### **14 CCR § 916.9 [936.9, 956.9], subsection (f)(2), (3), and (5)**

Throughout these subsections, amendments are made to replace the term “coho salmon ESU” with the revised term “Coastal Anadromy Zone” for consistency with the related definitional change proposed by the Board. The amendments are made to the following locations in the initial proposal: page 26, lines 14 and 16; page 27, line 25; page 28, line 2; page 34, lines 11 and 13; page 43, lines 8 and 10; page 49, lines 3 and 5; page 51, line 11; page 53, lines 4, 21 and 22; and page 55, line 13.

#### **14 CCR § 916.9 [936.9, 956.9], subsections (f)(2) Table of Prescriptive Standards**

The Board amended this subsection to include the protection measures for this zone in a table. The tables are included to support the prescriptive language proposed to be included in the rules under this rulemaking action. The amendment includes the following introductory language:

Table 1 specifies the enforceable standards to be used for protection of Class I watercourses for the area included in the coastal anadromy geographic area.

#### **14 CCR § 916.9 [936.9, 956.9], subsections (f)(2) Figure 4**

The Board amended Figure 4 with a new graphic to improve the interpretative quality of the picture. The summary of the prescriptive requirements were also amended to reflect requirements proposed in this re-noticed proposal. Should the Board elect to revise the prescriptive requirements or select requirements contained in the “Optional Amendments” contained in the amended proposal in its final adoption, the content of the graphic would accordingly be revised. The figure and accompanying text in the initial proposal are deleted.

#### **14 CCR § 916.9 [936.9, 956.9], subsections (f)(2)(A)-(C)**

The Board made a non- substantive amendment to correct a code citation related to channel zone exceptions on page 26, line 25; page 27, line 7; page 29, line 24; and page 30, line 14, of the initial proposal.

#### **14 CCR § 916.9 [936.9, 956.9], subsection (f)(2)(B) 1. – Inner Zone**

The Board amended the subsection to require postharvest trees to increase in QMD only when commercial thinning is used. The amendment in effect eliminates the postharvest QMD increase for plans that use selection harvesting. The Board determined this was necessary to address public concerns that those landowners who use selection silviculture would eventually not be able to use selection systems because this system is based on retaining and harvesting trees of all age classes, not on increasing average tree diameter.

**14 CCR § 916.9 [936.9, 956.9], subsection (f)(2)(B) 3. – Inner Zone post harvest canopy requirements**

The Board amended this subsection by revising subsection 3. and deleting Options 4 and 5, of the initial proposal on page 27, lines 18- 25 and page 28, lines 1-4. The Board also added a new Optional Amendment 100.

The amendments to subsection 3. incorporate an 80 percent overstory canopy for the Northern and Southern Forest practice districts of the coastal anadromy zone and a 70% overstory canopy for Northern Forest Practice District of the coastal andromy zone. This recognizes the difference in forest type and geography of the Klamath region encompassed by the Northern Forest District.

As part of this amendment, the Board supported hardwood species retained in the inner zone canopy because they provide shade to the watercourse and nutrients to not only fish, but to other aquatic species, and provide habitat for terrestrial species, as well. However, the Board eliminated the requirement that some hardwood species, such as alder, be retained rather than others because the ecological setting has primary influence over the hardwood species present.

The amendments that add Option 100 establish a 75% overstory canopy cover for the Coast and Southern Forest District and a 65% canopy cover for the Northern Forest District of the coastal anadromy zone. The lower ranges of these levels of overstory canopy retention have not been demonstrated to provide for properly functioning habitat needs. The proposed inner zone (from 30-70 feet from the watercourse) is within the distance that needs to provide a high level of watershed products to support anadromous salmonid habitat and meet the goals and intent of the FPRs. Primarily, this zone will provide LWD recruitment, shade for water temperature control, and wildlife habitat. 90% of potential LWD recruitment would come from this zone (Benda et al. 2003). Any harvest within this zone would potentially reduce this amount of LWD, and the Board determined that allowing a 60% canopy requirement would allow harvesting at levels that may decrease the LWD recruitment to a level that would not meet the goals for WLPZ functions and may decrease instream habitat suitability. The ISOR (Board of Forestry 2009) for this rule package suggests that overharvest in the inner zone can have significant implications for LWD recruitment. Most of the literature supports thinning from below, which would be consistent with the 80% overstory canopy requirement of the proposed rule.

The critical need for high levels of LWD and canopy closures is based on finding that salmonids clearly benefit by higher levels of LWD loading (SWC 2008, Wood Exchange Function). Pool spacing and sediment storage are coupled with LWD loading. In general, more instream LWD equals more pools and enhanced sediment storage (SWC 2008, Wood Exchange Function). Complete recovery of the wood function might require that the distribution of riparian forests become dominated by more mature stand conditions (SWC 2008, Wood Exchange Function). Timber harvesting that removes all or a significant percentage of large trees within a zone one tree height of the channel

will reduce the number of trees that potentially recruit to the channel, but in many California streams the majority (80-90%) of wood recruitment comes from a zone 30 to 100 ft of the channel edge (Benda et al. 2003). The maximum width needed to contribute almost all wood recruitment from tree fall is 1 tree height (McDade 1990).

The 60% overstory canopy would increase the risk of elevating stream temperatures to a level that might significantly impact listed anadromous salmonids. The reduction in tree retention would diminish the rule's effectiveness to meet the objectives of the inner zone, which are to develop a pool of trees for large wood recruitment, to provide additional shading, to develop vertical structural diversity, and to provide a variety of species (including hardwoods) for nutrient input. A decrease in the overstory canopy retention standard would also reduce the inner zone's effectiveness to filter sediment in close proximity to habitat for listed fish and other species.

Stream temperatures are influenced mostly by air temperature and direct solar radiation (Lewis et al. 2000), but also by groundwater inputs, base water flows, and other factors. Forest management activities that reduce riparian canopy can impact stream water temperatures by increasing solar radiation (Belt et al. 1992; Cafferata 1990). Increased water temperatures associated with timber harvesting are primarily associated with increases in direct solar radiation on the water surface (Brown and Krygier 1970).

Shade provided by riparian vegetation is the key factor controlling heat input to relatively small, mountain streams (SWC 2008, Heat Exchange Function). Higher percent canopy cover and tree height equals increased direct shading (SWC 2008, Heat Exchange Function). Canopy cover of greater than 80% generally kept water temperatures in a zone of preference for salmonids (SWC 2008, Heat Exchange Function, Figures from Lewis et al. 2000). Shade levels similar to old-growth were within 60 to 100 feet (Bestcha et al. 1987). Effective shading can be provided by buffer strips ranging from 33 to 100 feet, depending on stand type, age, and location (SWC 2008, Heat Exchange Function).

Opening the canopy cover over some streams increases productivity, but there are tradeoffs with other functions, such as heat regulation and wood recruitment potential. Opening the canopy too much can shift the algal communities to filamentous, which is less desirable. In addition, opening the canopy too much can increase temperatures to detrimental levels (SWC 2008, Biotic/Nutrients Exchange Function). The best way to avoid a shift to filamentous green algae is to maintain an intact riparian corridor that maintains low to moderate light intensities at the water surface (SWC 2008, Biotic/Nutrients Exchange Function).

Cafferata (1990) found that most direct solar radiation occurs within 80 feet of a stream. Generalized curves representing cumulative effectiveness of stream shading presented by the Forest Ecosystem Management Assessment Team (FEMAT) (Thomas et al. 1993) show 100 percent shading at a distance of 75 percent of tree height (i.e., 75 feet for a forested buffer with average canopy height of 100 feet) and 80 percent shading at about 50 percent of tree height. Figure 2 in the SWC (2008, Heat Exchange Function,



citing Lewis et al. 2000) shows that at canopy levels above 70-80% water temperatures are generally at levels DFG considers suitable for steelhead (<19-20 degrees C, see Sullivan et al., 2000).

If 60% vertical canopy were used, harvest within the inner zone could reduce vertical overstory canopy up to 40%, which would equal approximately a 15-20% increase in direct solar radiation as measured by angular canopy. Increases in direct solar radiation of 15-20% could raise water temperatures in interior streams to a level that would significantly impact salmonids.

**14 CCR § 916.9 [936.9, 956.9], subsection (f)(2)(B)4. Large conifer tree retention**

The Board found the initial proposed rule will better promote meeting the objectives of the Core and inner zones specified in 14 CCR § 916.9 [936.9, 956.9], subsections (c)(1) and (2) respectively, especially those regarding LWD recruitment. Retaining more of the largest conifers will provide more late seral habitat for wildlife over time.

One potential problem with the language in this section is that it could be interpreted to mean that the 26 largest conifers located within the area that encompasses the Core and inner zones must be retained (i.e., 13 in each zone). This is not the intention of the Board. The following language changes on page 28, line 6 clarify that the intent is to retain the 13 largest trees per each acre throughout core and inner zones:

Postharvest stand shall retain the 13 largest conifer trees (live or dead) on each acre of the area that encompasses the Core and Inner Zones.

The Board amended the initial proposal for this subsection to delete Optional Amendment 6 on page 28, lines 7-12 that allows substitution of smaller trees for LWD retention. Although there may be some situations where smaller trees that are closer and leaning toward the channel are more likely to recruit to the stream, this could undermine the other functions provided in the inner zone. Evaluating the impact of smaller tree substitutions would lengthen THP review. The retention of large diameter, and hence older, trees is considered more desirable for protecting salmonid habitat because mature trees will contribute a greater supply of LWD, increased shading and will promote bank stability much more than smaller diameter trees (SWC 2008). Source distance relationships for riparian functions support the concept of near-stream silvicultural prescriptions being driven by factors which emphasize retention and/or recruitment of large trees to facilitate riparian functions (SWC 2008). Lienkaemper and Swanson (1987), as cited in Cummins (1994) suggest that approximately 10 mature conifer trees per 100 meters of stream are needed to achieve debris loading similar to that in a mature forest stream system. SWC (2008) stated that to facilitate long-term recruitment of large wood loading in streams, management should encourage the development and retention of large trees in the near stream riparian zone.

**14 CCR § 916.9 [936.9, 956.9], subsection (f)(2)(B) 5 Large tree recruitment**

The amended this subsection in order to clarify that subsection 5 should more properly apply to subsection 1.-3., not 4., and provide more examples for selecting trees for retention.

“Large trees retained to meet 14 CCR § 916.9 [936.9, 956.9], subsections (f)(2)(B)1-~~(4)~~ 3 above that are the most conducive to recruitment to provide for the beneficial functions of riparian zones (~~i.e. e.g., trees with significant that~~ lean towards the channel, have an unimpeded fall path toward the watercourse, are in an advanced state of decay, are located on unstable areas or downslope of such an unstable areas, or have undermined roots) are to be given priority to be retained as future recruitment trees.”

Prioritization for tree retention in the inner zone should be based on size and likelihood of future recruitment as LWD. By applying the standard to (f)(2)(B)1.– 3. and not (B)4. it is clear that prioritization for tree retention should result in future potential LWD recruitment from increasing quadratic mean diameter in the postharvest stand, retention of recruitable dead trees, and 80% overstory canopy. The amendment specifically excludes from recruitment consideration the retention of the 13 largest conifers under (f)(2)(B)4. so that the retention of the 13 largest trees is not compromised by whether or not they are potentially recruitable per (f)(2)(B)5.

The amendment also replaces “with significant” with “that” on page 28, line18 in order to remove vagueness about what is a significant lean or not. This will facilitate more efficient project review.

**14 CCR § 916.9 [936.9, 956.9], subsection (f)(2)(B) 6 Angular Canopy Density**

The Board amended the initial proposal to delete Optional Amendment 7 that adds an 80 % angular canopy requirement. The best measure of forest cover necessary for providing shade to streams is angular canopy density (Brazier and Brown 1973). Although some field trials have concluded that 50% vertical canopy equals approximately 80% angular canopy (Nakamura 2000), this general relationship has not been rigorously established. Implementation and standardization of this metric, although more directly applicable to stream temperature, would be problematic and confusing for regulators and foresters. Additionally, there is no information or data relating angular canopy density to tree density. The Board does not have sufficient certainty in angular canopy density as a potential surrogate metric for tree density and thus LWD. Due to the lack of testing and information there is limited confidence in the

relationship between 80% angular canopy density and properly functioning salmonid habitat.

**14 CCR § 916.9 [936.9, 956.9], subsection (f)(2)(B) 7. Post harvest basal area for inner zone.**

The Board amended the initial proposal to delete Optional Amendment 8 that adds a basal area requirement to the inner zone. The Board has not validated whether these basal area standards are adequate, too restrictive, or provide for the riparian functions that support salmonid habitat. The proposed language for 80% canopy in 14 CCR § 916.9 [936.9, 956.9], subsection (f)(2)(B)(3) is adequate and simpler to apply and measure than basal area.

**14 CCR § 916.9 [936.9, 956.9], subsection (f)(2)(C) 1. – 2. Outer Zone**

The Board made non-substantive corrections to this subsection and other corrections to Optional Amendment 9. On page 29, line 21, of 14 CCR § 916.9 [936.9, 956.9], subsection (f)(2)(C), the Board change “timber harvesting” to “timber operations” for consistency of terminology used to route the Forest Practice Rules

Amendments made to Optional Amendment 9 include modifying the conditions under which windthrow would be used for purposes of requiring the Outer zone and adding “additional wood recruitment” as a condition for the Outer zone. The requirements that trigger the need for an Outer Zone are also re-indexed in the amendment for clarity. The result of the amendments is to further limit the conditions under which an outer zone would be required. By adding the language “significant windthrow” and “common occurrence” further qualifications are added to when an outer zone would be required.

Limiting implementation of outer zone protective measures to only those situations where windthrow is a significant, common, demonstrated occurrence or where tractor logging is proposed on greater than 50% slopes does not provide for fully supporting properly function salmonid habitat. Under Optional Amendment 9, several of the outer zone objectives proposed in 14 CCR § 916.9 [936.9, 956.9], subsection (c)(3) are not included in the WLPZ measures for the outer zone, such as microclimate control and terrestrial wildlife habitat. Optional Amendment 9 would eliminate the utility of the outer zone in meeting the goals and objectives of this section and make it necessary to reconsider the effectiveness of the proposed narrower Core and Inner zones, which would be made less effective without the Outer zone as proposed. Adoption of Optional Amendment 9 would have the following undesirable consequences:

1. An increase in ground-based yarding operations on slopes up to 49% as close as 101 feet from habitat of listed anadromous salmonids and other species.
2. An increase in sediment discharge to habitat of listed fish and other species resulting from a significantly narrower filter strip, especially when non-paved roads are nearby, which is often the case.
3. Potential delays in project review due to debate over whether “windthrow is a demonstrated occurrence” (for example, how will occurrence of windthrow be determined in an in-tact stand prior to harvest? What parameters are to be used

when making such a prediction? How much do we know about windthrow frequency in all areas affected by the rule?).

An outer zone will 'buffer the buffer' in order to protect the WLPZ from disturbance, not only when steep slopes are next to the area of the WLPZ. For example, studies carried out in Caspar Creek showed that an additional "fringe" buffer is necessary to sustain appropriate tree-fall rates within the core buffer (Reid & Hilton, 1998). The authors suggested that the appropriate width of fringe buffer needed to protect the core zone will need to be determined using an analysis of the long-term effects and significance of accelerated tree-fall rates after logging.

#### **14 CCR § 916.9 [936.9, 956.9], subsection (f)(2)(D) Best Management Practices**

The Board amendment to the title of this subsection is to change the proposed term "Best Management Practices". The Board changed the term "Best Management Practices" to "Preferred Management Practices" to avoid confusion with the Best Management Practices term which is most commonly associated with in federal section 208 water quality laws and in state statute PRC § 4514.3. The proposed requirements in this section are not intended to directly address the federal requirements. The changes would apply on Page 31, Lines 1 and 3, of the initial proposal.

#### **14 CCR § 916.9 [936.9, 956.9], subsection (f)(2)(E) Additional Special Operating Zone**

The Board amended the initial proposed language for clarity regarding the description of solar radiation and does not specify the required width of the zone. In addition, the Board included both understory and mid-canopy conifers and hardwoods in order to best intercept low angle solar radiation. The following revisions reflect these changes:

"..... RPF shall consider the need for a special operating zone for purposes of shading the watercourse from direct low angle solar radiation from beneath the overstory canopy additional shading from solar radiation from beneath the overstory canopy that is expected to have a potential significant adverse impact on water temperature. When there is a determination for the need of the special operating zone is needed, the special operating zone shall retain understory ~~or~~ and mid-canopy conifers and hardwoods. These trees shall be protected during falling, yarding and site preparation to the extent feasible. Width of the zone shall be 50 feet measured from the landward edge of the Outer Zone."

These revisions add the requirement to consider including a SOZ results in additional mitigation that would be consistent with the goals and objectives of this section. Clarifying direct low angle solar radiation coming from beneath the canopy provides more specificity about the concern for solar radiation impacting water temperature and evaluating this particular cumulative impact along a Class I watercourse. Specifying the standard width of the zone provides a consistent and enforceable requirement that can be evaluated for effectiveness, and will avoid delay in review and approval of the plan.

The need for a SOZ in watersheds with listed salmonids for north facing aspects also addresses cumulative watershed impacts. In Mendocino County's Ten Mile watershed, DFG has documented the occurrence of direct low and high angle radiation beneath the WLPZ overstory canopy generated from adjacent clearcuts on moderate to steep north facing slopes (Floerke 2006a, 2006b; Stacey 2007) and identified potential cumulative adverse impacts to Class I and II watercourses (Pollock and Kennard 1998). Past timber harvesting that removed canopy along segments of watercourses and old transportation corridors, leaving longitudinal openings, combined with canopy removal in new THPs adjacent to these segments are cumulatively exposing more segments of watercourses to direct solar radiation. This could impact stream temperature, resulting in impacts to listed salmonids.

Three DFG pre-harvest inspection (PHI) reports detail large zones of depleted overstory canopy and LWD recruitment, approximately 50 feet-wide on average, in Class I and Class II WLPZs. These zones were created by the presence of old railroads and roads, including their cut- and fill-face slopes in the WLPZs. In addition, intense harvesting occurred around these zones in the past. DFG found these existing impacts allowed direct solar radiation on streams in the Ten Mile watershed particularly on steep north facing aspects (e.g., north, northeast and northwest) facing slopes. Several openings were also identified in prior THP WLPZs located adjacent to new THPs under review. These openings showed that north facing aspects are unique in allowing direct solar radiation on the streams from underneath and between the overstory WLPZ trees. Typically, these WLPZs were located between the stream and recent (<10 years old) clearcut harvests, as close as 100 feet from the stream channel.

New THPs under review located on north aspects and adjacent to the watercourse and between past THPs have these impacted WLPZs. The new THPs proposed clearcutting landward of the new WLPZs on north facing aspects. The new THPs also proposed harvesting in their respective WLPZs. The forest stands in these WLPZs are composed of young trees which are even-aged and even-structured caused by past clearcutting down to the stream bank 60 to 80 years ago. The recovering tree canopy is concentrated in the upper portion of limbs of the timber stand canopy because the lower canopy limbs succumbed to dense tree spacing and too little light penetration. Clearcutting north facing slopes in these dense and monotypic-structured stands enables sun light to radiate streams from beneath the WLPZ overstory since there's little intervening canopy beneath the overstory to screen the stream. DFG estimated the height of the opening between the overstory and the forest floor to be 50 to 60 feet.

DFG found that the combination of intensive harvesting near streams and the existing conditions would likely increase the potential for mid-morning or afternoon sunlight primarily during the summer time to penetrate beneath and through the WLPZ overstory and radiate the stream. Direct solar radiation on streams is a primary driver of stream temperature increases in the summer time (Pollock and Kennard 1998, see pages 13-16).

Although Pollock and Kennard (1998) did not specifically recommend an SOZ to mitigate this impact, their report points out that stream warming occurs primarily from direct solar radiation and other factors, such as the potential for clearcutting to heat the forest floor and shallow groundwater aquifers, which were shown to heat receiving streams. They recommended for Washington forestry practices, a much wider stream buffer than California requires in order to address angular solar radiation.

**14 CCR § 916.9 [936.9, 956.9], subsections (f)(3) Table of Prescriptive Standards**

The Board amended this subsection to include the protection measures for this zone in a table. The tables are included to support the prescriptive language proposed to be included in the rules under this rulemaking action. The amendment includes the following introductory language:

Table 2 specifies the enforceable standards to be used for protection of Class I watercourses with flood prone area or channel migration zones.

**14 CCR § 916.9 [936.9, 956.9], subsections (f)(3) Figure 5**

The Board amended Figure 5 with a new graphic to improve the interpretative quality of the picture. The summary of the prescriptive requirements were also amended to reflect requirements proposed in this re-noticed proposal. Should the Board elect to revise the prescriptive requirements or select requirements contained in the “Optional Amendments” contained in the amended proposal in its final adoption, the content of the graphic would accordingly be revised. The figure and accompanying text in the initial proposal are deleted.

**14 CCR § 916.9 [936.9, 956.9], subsections (f)(3)(A)-(E)** The Board made a non-substantive amendment to correct a code citation related to channel zone exceptions on page 33, line 8 and line 17; page 39, line 9; and page 39, line 3 and line 20; of the initial proposal.

**14 CCR § 916.9 [936.9, 956.9], subsection (f)(3)(C) Inner A Zone**

The Board amended this subsection by revising subsection 3. and deleting Options 4 and 5 of the initial proposal on page 34, lines 4- 15. The amendments to subsection 3. incorporate an 80 percent overstory canopy for the Northern and Southern Forest practice districts of the coastal anadromy zone and a 70% overstory canopy for all other

listed watersheds. This recognizes the difference in forest type and geography of the Klamath region encompassed by the Northern Forest District.

As part of this amendment, the Board supported hardwood species retained in the Inner zone A canopy because they provide shade to the watercourse and nutrients to not only fish, but to other aquatic species, and provide habitat for terrestrial species, as well. However of the Board eliminated the requirement that some hardwood species, such as alder, be retained rather than others because the ecological setting has primary influence over the hardwood species present.

The amendments will protect off-channel floodplain habitat critical to salmonid survival and recovery. Off-channel floodplain habitat is identified in DFG's Coho Recovery Plan for protection. This proposal will greatly improve forest management in floodplain areas of Class I watercourses and recognizes this important salmonid habitat feature. Floodplains provide essential habitats for threatened salmonid species. For example, it is well established in the scientific literature that juvenile Coho and Chinook salmon in California and the Pacific Northwest utilize floodplain areas such as off-channel ponds, sloughs and other areas of standing water on the floodplain as important over wintering and rearing habitats (Tshapalinski and Hartman 1983; Swales and Levings 1989; Nickelson and others, 1992; Solazzi et al. 2000; Bramblett et al. 2002; Giannico and Hinch 2003; Pollock et al. 2004; Morley and others. 2005; Sommer et al. 2005; Henning et al. 2006; Roni et al. 2006; Henning et al. 2007; Jeffres et al. 2008; Rosenfeld et al. 2008). It is widely accepted that the loss of such habitats has been an important factor in the decline of anadromous salmonids in California and the Pacific Northwest (Gregory and Bisson 1996; CDFG 2004; Moyle et al. 2008; NOAA 2009a, 2009b).

#### **14 CCR § 916.9 [936.9, 956.9], subsection (f)(3)(C)4. Large conifer tree retention**

The Board found the initial proposed rule will better promote meeting the objectives of the Core and inner zones specified in 14 CCR § 916.9 [936.9, 956.9], subsections (c)(1) and (2) respectively, especially those regarding LWD recruitment. Retaining more of the largest conifers will provide more late seral habitat for wildlife over time.

One potential problem with the language in this section is that it could be interpreted to mean that the 26 largest conifers located within the area that encompasses the Core and inner zones must be retained (i.e., 13 in each zone). This is not the intention of the Board. The following language changes on page 34, line 16-17 clarify that the intent is to retain the 13 largest trees per on each acre throughout core and inner zones:

Postharvest stand shall retain the 13 largest conifer trees (live or dead) on each acre of the area that encompasses the Core and Inner Zones.

The Board amended the initial proposal for this subsection to delete Optional Amendment 6 on page 34, lines 17-23 that allows substitution of smaller trees for LWD retention. Although there may be some situations where smaller trees that are closer and leaning toward the channel are more likely to recruit

to the stream, this could undermine the other functions provided in the inner zone. Evaluating the impact of smaller tree substitutions would lengthen THP review. The retention of large diameter, and hence older, trees is considered more desirable for protecting salmonid habitat because mature trees will contribute a greater supply of LWD, increased shading and will promote bank stability much more than smaller diameter trees (SWC 2008). Source distance relationships for riparian functions support the concept of near-stream silvicultural prescriptions being driven by factors which emphasize retention and/or recruitment of large trees to facilitate riparian functions (SWC 2008). Lienkaemper and Swanson (1987), as cited in Cummins (1994) suggest that approximately 10 mature conifer trees per 100 meters of stream are needed to achieve debris loading similar to that in a mature forest stream system. SWC (2008) stated that to facilitate long-term recruitment of large wood loading in streams, management should encourage the development and retention of large trees in the near stream riparian zone.

**14 CCR § 916.9 [936.9, 956.9], subsection (f)(3)(C) 5. Large tree recruitment**

The Board amended this subsection in order to clarify that subsection 5 should more properly apply to subsection 1.-3., not 4., and provide more examples for selecting trees for retention.

“Large trees retained to meet 14 CCR § 916.9 [936.9, 956.9], subsections (f)(3)(C)1-~~4~~ 3 above that are the most conducive to recruitment to provide for the beneficial functions of riparian zones (~~i.e. e.g., trees with significant that~~ lean towards the channel, have an unimpeded fall path toward the watercourse, are in an advanced state of decay, are located on unstable areas or downslope of such an unstable areas, or have undermined roots) are to be given priority to be retained as future recruitment trees.”

Prioritization for tree retention in the inner zone should be based on size and likelihood of future recruitment as LWD. By applying the standard to (f)(3)(C)1.-3. and not (C)4. it is clear that prioritization for tree retention should result in future potential LWD recruitment from increasing quadratic mean diameter in the postharvest stand, retention of recruitable dead trees, and 80% overstory canopy. The amendment specifically excludes from recruitment consideration the retention of the 13 largest conifers under (f)(3)(C)4. so that the retention of the 13 largest trees is not compromised by whether or not they are potentially recruitable per (f)(3)(C)5.

The amendment also replaces “with significant” with “that” on page 35, line1 in order to remove vagueness about what is a significant lean or not. This will facilitate more efficient project review.



**14 CCR § 916.9 [936.9, 956.9], subsection (f)(3)(C) 6 Angular Canopy Density**

The Board amended the initial proposal to delete Optional Amendment 7 that adds an 80 % angular canopy requirement. The best measure of forest cover necessary for providing shade to streams is angular canopy density (Brazier and Brown 1973). Although some field trials have concluded that 50% vertical canopy equals approximately 80% angular canopy (Nakamura 2000), this general relationship has not been rigorously established. Implementation and standardization of this metric, although more directly applicable to stream temperature, would be problematic and confusing for regulators and foresters. Additionally, there is no information or data relating angular canopy density to tree density. The Board does not have sufficient certainty in angular canopy density as a potential surrogate metric for tree density and thus LWD. Due to the lack of testing and information there is limited confidence in the relationship between 80% angular canopy density and properly functioning salmonid habitat.

**14 CCR § 916.9 [936.9, 956.9], subsection (f)(3)(C) 7. Post harvest basal area for Inner Zone A.**

The Board amended the initial proposal to delete Optional Amendment 8 that adds a basal area requirement to the inner zone. The Board has not validated whether these basal area standards are adequate, too restrictive, or provide for the riparian functions that support salmonid habitat. The proposed language for 80% canopy in 14 CCR § 916.9 [936.9, 956.9], subsection (f)(3)(C)3. is adequate and simpler to apply and measure than basal area.

**14 CCR § 916.9 [936.9, 956.9], subsection (f)(3)(D) C Inner B Zone**

The Board amended language for clarity, and to follow standard accepted hydrology terminology. The word “typically” should be deleted since it could result in difficulty enforcing the provisions of this section. Also, describing a flood prone area as “very wide” lacks clarity. Additionally, change the word “is” to the word “are” on page 36, line 7 and extra spaces on page 36 line 4 and 5 were removed.

(D) Inner Zone B: The Inner Zone B is typically applicable when there are very wide flood prone areas. The Inner Zone B encompasses the portion of the flood prone area from the landward edge of the Inner Zone A (i.e.150 feet from the WTL) to the landward edge of the flood prone area. The landward edge of the Inner Zone B (i.e. the landward perimeter of the flood prone area) shall be established in accordance with flood prone area definitions in 14 CCR § 895.1. Timber operations are is . . .

**14 CCR § 916.9 [936.9, 956.9], subsection (f)(3)(E) Best Management Practices**

The Board amendment to the title of this subsection is to change the proposed term “Best Management Practices”. The Board changed the term “Best Management Practices” to “Preferred Management Practices” to avoid confusion with the Best Management Practices term which is most commonly associated with in federal section 208 water quality laws and in state statute PRC § 4514.3 The proposed requirements in this section are not intended to directly address the federal requirements. The changes would apply on the following pages of the initial proposal:

Page 36, line 17 and 19, and Page 46 lines 21 and 23.

Additionally, the Board should revise the reference on page 37, line 24; a code section is missing—add “(f)” to citation.

**14 CCR § 916.9 [936.9, 956.9], subsection (f)(3)(F)1-2 Outer Zone**

The Board made corrections to Optional Amendment 9. Amendments made to Optional Amendment 9 include modifying the conditions under which windthrow would be used for purposes of requiring the Outer zone and adding “additional wood recruitment” as a condition for the Outer zone. The requirements that trigger the need for an Outer Zone are also re-indexed in the amendments for clarity. The result of amendments is to further limit the conditions under which an outer zone would be required. By adding the language “significant windthrow” and “common occurrence” further qualifications are added to when an outer zone would be required. Also see analysis on Option 9 for the Outer zone for confined Class I WLPZ in the coastal anadromy zone.

**14 CCR § 916.9 [936.9, 956.9], subsection (f)(4) Site Specific FPA plans**

The Board deleted this section and moved it to 14 CCR § 916.9 [936.9, 956.9], subsection (v). The FPA site specific plan should be located with the requirements for site specific analysis in subsection 14 CCR § 916.9 [936.9, 956.9], subsection (v). The amendment reduces confusion and duplication and provides consistency for all site specific plans.

Within the site specific plan 14 CCR § 916.9 [936.9, 956.9], subsection (f)(4)(C)(3), is amended to deleted the requirement for assessing only limiting factors for salmonids. A desired trajectory should be for each of the objectives outlined for the T/I rules, including sediment, water temperature, flow, large wood recruitment, among others stated in 14 CCR § 916.9 [936.9, 956.9], subsection (a), for development of properly functioning salmonid habitat and restoration of the beneficial uses of the riparian zone. Restricting consideration for site-specific analysis to limiting factors for salmonids should meet CEQA standards for the measures resulting from a site-specific analysis, but would not meet the goal of recovering listed salmonids.

Additionally, on page 41, line 3, the section refers to 916.6 instead of 916.9. This correction should be made.

**14 CCR § 916.9 [936.9, 956.9], subsections (f)(5) Class I watercourses outside the coho ESU**

The Board amended the index subsection number on page 43, line 8 of the initial proposal to correspond to the deletion of the flood prone area site specific plan. The subsection is re-index as 14 CCR § 916.9 [936.9, 956.9], subsections (f)(4).

**14 CCR § 916.9 [936.9, 956.9], subsections (f)(5) Table of Prescriptive Standards**

The Board amended this subsection on page 43, line 16, of the initial proposal to include the protection measures for this zone in a table. The tables are included to support the prescriptive language proposed to be included in the rules under this rulemaking action. The amendment includes the following introductory language:

Table 3 specifies the enforceable standards to be used for protection of Class I watercourses for the area included outside the coastal anadromy zone.

**14 CCR § 916.9 [936.9, 956.9], subsections (f)(5) Figure 6**

The Board amended Figure 6 on page 48, line 1, of the initial proposal with a new graphic to improve the interpretative quality of the picture. The summary of the prescriptive requirements were also amended to reflect requirements proposed in this re-noticed proposal. Should the Board elect to revise the prescriptive requirements or select requirements contain in the “Optional Amendments” contained in the amended proposal in its final adoption, the content of the graphic would accordingly be revised. The figure and accompanying text in the initial proposal are deleted.

**14 CCR § 916.9 [936.9, 956.9], subsections (f)(5)(A)-(C)**

The Board made a non- substantive amendment to correct a code citation related to channel zone exceptions on page 43, line 19; page 44, line 1; and page 46, line 13, of the initial proposal.

**14 CCR § 916.9 [936.9, 956.9], subsection (f)(5)(B) 1. – Inner Zone**

The Board amended the subsection to require postharvest trees to increase in QMD only when commercial thinning is used. The amendment in effect eliminates the postharvest QMD increase for plans that use selection harvesting. The Board determined this was necessary to address public concerns that those landowners who use selection silviculture would eventually not be able to use selection systems because this system is based on retaining and harvesting trees of all age classes, not on increasing average tree diameter.

**14 CCR § 916.9 [936.9, 956.9], subsection (f)(5)(B) 3. – Inner Zone post harvest canopy requirements**

The Board amended this subsection by revising subsection 3. and deleting Options 4, of the initial proposal on page 44, lines 12- 16. As part of this amendment, the Board supported hardwood species retained in the inner zone canopy because they provide shade to the watercourse and nutrients to not only fish, but to other aquatic species, and provide habitat for terrestrial species, as well. However of the Board deleted the requirement on page 44 line 15 of the initial proposal that some hardwood species, such as alder, be retained rather than others because the ecological setting has primary influence over the hardwood species present.

**14 CCR § 916.9 [936.9, 956.9], subsection (f)(5)(B)4. Large conifer tree retention**

The Board found the initial proposed rule will better promote meeting the objectives of the Core and inner zones specified in 14 CCR § 916.9 [936.9, 956.9], subsections (c)(1) and (2) respectively, especially those regarding LWD recruitment. Retaining more of the largest conifers will provide more late seral habitat for wildlife over time.

One potential problem with the language in this section is that it could be interpreted to mean that the 14 largest conifers located within the area that encompasses the Core and inner zones must be retained (i.e., 7 in each zone). This is not the intention of the Board. The following language changes on page 44, line 18 clarify that the intent is to retain the 7 largest trees per on each acre throughout core and inner zones:

Postharvest stand shall retain the 7 largest conifer trees (live or dead) on each acre of the area that encompasses the Core and Inner Zones.

The Board amended the initial proposal for this subsection to delete Optional Amendment 6 on page 44, lines 19-24 that allows substitution of smaller trees for LWD retention. Although there may be some situations where smaller trees that are closer and leaning toward the channel are more likely to recruit to the stream, this could undermine the other functions provided in the inner zone. Evaluating the impact of smaller tree substitutions would lengthen THP review. The retention of large diameter, and hence older, trees is considered more desirable for protecting salmonid habitat because mature trees will contribute a greater supply of LWD, increased shading and will promote bank stability much more than smaller diameter trees (SWC 2008). Source distance relationships for riparian functions support the concept of near-stream silvicultural prescriptions being driven by factors which emphasize retention and/or recruitment of large trees to facilitate riparian functions (SWC 2008). Lienkaemper and Swanson (1987), as cited in Cummins (1994) suggest that approximately 10 mature conifer trees per 100 meters of stream are needed to achieve debris loading similar to that in a mature forest stream system. SWC (2008) stated that to facilitate long-term recruitment of large

wood loading in streams, management should encourage the development and retention of large trees in the near stream riparian zone.

**14 CCR § 916.9 [936.9, 956.9], subsection (f)(5)(B) 5. Large tree recruitment**

This subsection was amended in order to clarify that subsection 5. should more properly apply to subsection 1.-3., not 4., and provide more examples for selecting trees for retention.

“Large trees retained to meet 14 CCR § 916.9 [936.9, 956.9], subsections (f)(5)(B)1-~~4~~ 3 above that are the most conducive to recruitment to provide for the beneficial functions of riparian zones (~~i.e. e.g., trees with significant that~~ lean towards the channel, have an unimpeded fall path toward the watercourse, are in an advanced state of decay, are located on unstable areas or downslope of such an unstable areas, or have undermined roots) are to be given priority to be retained as future recruitment trees.”

Prioritization for tree retention in the inner zone should be based on size and likelihood of future recruitment as LWD. By applying the standard to (f)(5)(B)1. - 3. and not (B)4., it is clear that prioritization for tree retention should result in future potential LWD recruitment from increasing quadratic mean diameter in the postharvest stand, retention of recruitable dead trees, and 80% overstory canopy. The amendment specifically excludes from recruitment consideration the retention of the 7 largest conifers under (f)(5)(B)4. so that the retention of the 7 largest trees is not compromised by whether or not they are potentially recruitable per (f)(5)(B)5.

The amendment also replaces “with significant” with “that” on page 45, line3 in order to remove vagueness about what is a significant lean or not. This will facilitate more efficient project review.

**14 CCR § 916.9 [936.9, 956.9], subsection (f)(5)(B) 6 Angular Canopy Density**

The Board amended the initial proposal to delete Optional Amendment 7 that adds an 80% angular canopy requirement. This deletion is consistent with other previous disclosures on the deletion of ACD.

**14 CCR § 916.9 [936.9, 956.9], subsection (f)(5)(B) 7. Post harvest basal area for inner zone.**

The Board amended the initial proposal to delete Optional Amendment 8 that adds a basal area requirement to the inner zone. The Board has not validated whether these basal area standards are adequate, too restrictive, or provide for the riparian functions that support salmonid habitat. The proposed language for 70% canopy in 14 CCR §

916.9 [936.9, 956.9], subsection (f)(5)(B)3. is adequate and simpler to apply and measure than basal area.

#### **14 CCR § 916.9 [936.9, 956.9], subsection (f)(5)(C) Outer Zone**

The Board amended the subsection to add Optional Amendment 101.

Amendments in Optional Amendment 101 are similar as those in Optional Amendment 9 disclosed for other Class I watercourse in this proposal. Included in the amendment is modifying the conditions under which windthrow would be used for purposes of requiring the Outer zone and adding “additional wood recruitment” as a condition for the Outer zone. The result of amendments is to further limit the conditions under which an outer zone would be required. By adding the language “significant windthrow” and “common occurrence” further qualifications are added to when an outer zone would be required.

Limiting implementation of outer zone protective measures to only those situations where windthrow is a significant, common, demonstrated occurrence or where tractor logging is proposed on greater than 50% slopes does not provide for fully supporting properly function salmonid habitat. Under Optional Amendment 101, several of the outer zone objectives proposed in 14 CCR § 916.9 [936.9, 956.9], subsection (c)(3) are not included in the WLPZ measures for the outer zone, such as microclimate control and terrestrial wildlife habitat. Optional Amendment 101 would eliminate the utility of the outer zone in meeting the goals and objectives of this section and make it necessary to reconsider the effectiveness of the proposed narrower Core and Inner zones, which would be made less effective without the Outer zone as proposed. Adoption of Optional Amendment 101 would have the following undesirable consequences:

1. An increase in ground-based yarding operations on slopes up to 49% as close as 101 feet from habitat of listed anadromous salmonids and other species.
2. An increase in sediment discharge to habitat of listed fish and other species resulting from a significantly narrower filter strip, especially when non-paved roads are nearby, which is often the case.
3. Potential delays in project review due to debate over whether “windthrow is a demonstrated occurrence” (for example, how will occurrence of windthrow be determined in an in-tact stand prior to harvest? What parameters are to be used when making such a prediction? How much do we know about windthrow frequency in all areas affected by the rule?).

An outer zone will ‘buffer the buffer’ in order to protect the WLPZ from disturbance, not only when steep slopes are next to the area of the WLPZ. For example, studies carried out in Caspar Creek showed that an additional “fringe” buffer is necessary to sustain appropriate tree-fall rates with in the core buffer (Reid & Hilton, 1998). The authors suggested that the appropriate width of fringe buffer needed to protect the core zone will need to be determined using an analysis of the long-term effects and significance of accelerated tree-fall rates after logging.

In summary, limiting the outer zone pursuant this Option would result in the WLPZ being a 70 feet in width. Buffer widths of this nature have not been supported by the scientific literature and would have unknown adverse environmental consequences. This is based on the following information:

- Science review found that a 30 m (100 ft) is needed to provide for the full suite of riparian functions necessary to produce properly functioning aquatic habitat for listed anadromous salmonids.
- There are many goals for the outer zone that do not relate to only sediment control (additional wood recruitment, additional shading, terrestrial wildlife habitat, etc.).
- Considering sediment control, Coe (2006) found that sediment could be transported 40 m below roads. Hence a buffer plus equipment limitation zone of this width is supported (~125 ft). Allowing new roads to be constructed or reconstructed within 70 ft of the WLPZ would easily allow sediment to be transported to the bankfull channel edge. The scientific literature indicates that roads located within 200 ft of watercourse channel produce considerably more sediment than those located greater distances.
- The literature states that most large wood recruitment (75% to 90%) comes from  $\frac{3}{4}$  of one site potential tree height, on average, which equates to a buffer of approximately 95 ft in areas with ponderosa pine, Jeffery Pine, mixed conifer and true fir (CA FPRs Sec 1060—using an average of 100 yr site index for site classes 1-IV as an approximation of  $\frac{3}{4}$  site potential tree height). Spence et al. 1996 state that buffer widths of approximately  $\frac{3}{4}$  site potential tree height are needed to provide full protection of stream shading, litter inputs, and nutrient regulation.
- SWC reported that biotic productivity in streams with conifer-dominated buffer strips that are wider than about 30 m (100 ft) is similar to that observed in an unlogged forest.
- If there is evidence of a windthrow problem, an optional wind buffer should be added in addition to the 100 ft buffer.
- Total buffer width, including the outer zone is critical for terrestrial wildlife.

#### **14 CCR § 916.9 [936.9, 956.9], subsection (f)(5)(D) Best Management Practices**

The Board amended the title of this subsection to change the proposed reference the term “Best Management Practices”. The Board changed the term “Best Management Practices” to “Preferred Management Practices” to avoid confusion with the Best Management Practices term which is most commonly associated with in federal section 208 water quality laws and in state statute PRC § 4514.3 The proposed requirements

in this section are not intended to directly address the federal requirements. The changes would apply on Page 46, Lines 21 and 23 of the initial proposal.

**14 CCR § 916.9 [936.9, 956.9], subsection (f)(5)(E)**

The Board deleted this subsection and did not find necessary a Special Operating Zone as provided for in 14 CCR § 916.9 [936.9, 956.9], subsection (f)(5)(E) in watersheds outside of the Coho ESU. This generally encompasses the Sacramento River and tributaries that support federally threatened Central Valley Steelhead and State threatened spring-run Chinook salmon. Documented occurrence and impacts were not found for this region.

**14 CCR § 916.9 [936.9, 956.9], subsection (g) Class II watercourses**

The Board amended the introductory section on page 49, lines 1-5 to replace the term “coho salmon ESU” with the revised term “Coastal Anadromy Zone” for consistency with the related definitional change proposed by the Board. The introductory section should also be amended to exclude the Southern Subdistrict (SSD) of the Coast Forest District from the requirements for Class II watercourses stated for all other watersheds with listed anadromous salmonids. The Board created in this revised proposal new, separate Class II watercourse requirements for the SSD as described in 14 CCR § 916.9 [936.9, 956.9], subsection (g)(3). Other grammatical changes are made for clarity:

The following are the minimum requirements for Class II WLPZ delineation and for timber operations in Class II WLPZs. Differing rules are specified for watersheds in the ~~coho salmon ESU~~ coastal anadromy zone, the Southern Subdistrict of the Coast Forest District, and areas outside the ~~coho salmon ESU~~ coastal anadromy zone. WLPZ widths ranges from 50 to 100 feet slope distance, depending on side slope steepness in the WLPZ and the watercourse type.

**14 CCR § 916.9 [936.9, 956.9], subsection (g) Class II watercourses revised WLPZ graphics**

The Board amended on, Page 58, Figure 7, the graphics in this subsection to improve the interpretative quality of the picture. The summary of the prescriptive requirements were also amended to reflect requirements proposed in this re-noticed proposal. Should the Board elect to revise the prescriptive requirements or select requirements contain in the “Optional Amendments” contained in the amended proposal in its final adoption, the content of the graphic would accordingly be revised. The figure and accompanying text in the initial proposal are deleted. Other amendments include editing the title to replace the term “coho salmon ESU” with the revised term “Coastal



Anadromy Zone excluding the Southern Subdistrict (SSD) of the Coast Forest Practice District” for consistency with the related definitional change.

**14 CCR § 916.9 [936.9, 956.9], subsection (g)(1) – Identification of Large Class II watercourses**

The Board made substantive amendments to this subsection to revise the methods of delineating a Class II - large watercourses and Class II- standard watercourses. The Board also retained the delineation procedure in the initial proposal under this section as Option 102.

The proposed amendment limits the number of office based approaches available for delineating Class II large watercourses. This is proposed because some of the approaches in the initial proposal (and contained in Option 102) do not specify delineation thresholds; rely on field-based methods that are not appropriate or well developed for determining mid-summer flow; will require plan submitters to provide extensive data in order for review team agencies to verify delineations; and would require field inspections to determine if delineation results are accurate. Some review team agencies are not always able to conduct extensive pre-harvest inspections and have increasingly limited resources to verify delineation results in the field. The proposed amendment places the burden for proof on review team agencies that a standard Class II watercourse should be delineated as “large” and receive enhanced protection measures. Given the uncertainties with some of the approaches for identifying large Class II watercourses, inadequate protection of the riparian functions and headwater stream products that support anadromous salmonid habitat could result. Inadequate protection of headwater streams will reduce the effectiveness of the proposed Class I WLPZ measures and undermine the goals and intent of the T/I rules.

The Board amendment would require a preliminary delineation of large Class II watercourses based on second order or larger Class II watercourses using the stream order method. Such preliminary identification ensures a reliable number of Class II watercourses will be delineated as large and receive enhanced protection measures. The Board supports plan submitters’ field-based methods, including continuous monitoring data and direct observation, to justify proposed modifications to the results of the office determination. This allows flexibility for plan submitters to delineate large Class II watercourses and to make adjustments when they believe a watercourse does not meet the definition in 14 CCR § 916.9 [936.9, 956.9], subsection (g)(1). The following changes are made to 14 CCR § 916.9 [936.9, 956.9], subsection (g)(1) on page 49, lines 11 through 14:

Identification of Class II-L watercourse types shall be based on ~~one or~~  
~~more of~~ the office methods specified under 14 CCR § 916.9 [936.9, 956.9]  
subsection (g) (1) (A). ~~and~~ The field methods specified under 14 CCR §

916.9 [936.9, 956.9], subsection (g) (1) (B) may be used to justify proposed modifications to the results of the office determination.

The amendment is further necessary because relying primarily on field identification of perennial flow may cause some large Class II watercourses to be delineated as standard Class II. Defining a large Class II watercourse as having perennial flow is not reliable in dry years and is not always apparent in all settings. For example, on the north coast many large Class II watercourses that flow in the summer don't exhibit surface flow in their lower reach when the lower reach has been filled with sediment. Erosion under past harvesting practices has filled in channels and the surface flow becomes subsurface in this accumulated sediment. In such a situation, the gravel and sediment moderate water temperature, regardless of the initial temperature upstream. Canopy cover in this reach may not contribute to water temperature, but is still necessary to account for supply of large wood and sediment retention. It is important to keep in mind all of the watershed products from Class II watercourses when considering perennial or intermittent flow. Also, streams on the north coast, including Class II watercourses, exhibit a flashy hydrograph with large fluctuations in flow over relatively short time periods. These streams often exhibit ephemeral surface flow. Streams with a flashy hydrograph can have greater ability to transport LWD to Class I habitat due to increased energy associated with shorter duration higher flows. Although LWD recruitment is not currently included as a consideration for determining whether a Class II watercourse is large, considering the LWD supply and recruitment component will contribute to protection of habitat for listed anadromous fish species.

#### **14 CCR § 916.9 [936.9, 956.9], subsection (g)(1)(A)1. Stream order**

The Board amended the subsection to solely use stream order to identify large Class II watercourses. The amendments require delineation of second order and higher streams as large Class II watercourses. The amendments delete the text "Class II" from page 49, line 19, because stream order should be determined based on mapping of all watercourses, not just Class II watercourses. Mapping Class II watercourses first before identifying all streams and their order will result in inaccurate identification of Class II watercourses. Mapping and then ordering all watercourses makes the stream order criterion clear, based on readily determinable facts, and easily implemented by plan preparers and evaluated by plan reviewers.

The amendments also delete the word "potential" as office methods of determining Class –II large watercourses. The term was deleted as the office approach will provide a reliable classification system and the field based approaches are used only to refute the office classification method. The following changes show the amendments:

#### **(A) Office-based approaches to identify ~~potential~~ Class II-L watercourses:**

1. ~~Stream order:~~ After classifying the watercourses in an area pursuant to 14 CCR § 916.5 [936.5, 956.5], map all ~~Class II~~ watercourses

~~in the plan area of consideration on area of consideration on current 1:24,000 scale U.S. Geological Survey topographic maps and “order” them and upslope in the watershed, at a level of detail sufficient to determine the stream order of all Class II watercourses in the plan area. Stream order shall be determined following the method defined 14 CCR 895.1. Second order and third order and higher Class II watercourses shall be identified as are potentially Class II-L watercourses.~~

**14 CCR § 916.9 [936.9, 956.9], subsection (g)(1)(A)2. Blue Line Streams**

The Board amended the initial proposal to delete this subsection. Blue line USGS maps do not identify Class II watercourses with consideration of the presence of mid-summer flow.

**14 CCR § 916.9 [936.9, 956.9], subsection (g)(1)(A) 3 Drainage Area**

The Board amended the initial proposal to delete this subsection because it is an undeveloped approach for application at a statewide scale, will increase the length of time required to justify and review watercourse classification, and will increase the amount of documentation needed for timber harvesting plans.

**14 CCR § 916.9 [936.9, 956.9], subsection (g)(1)(B) Field-based approaches to identify large Class II watercourses**

The Board amended the initial proposal to support plan submitters' using field-based approaches to modify the results of preliminary office-based approaches. This allows flexibility for plan submitters to make specific modifications when they believe a watercourse does not meet the definition in 14 CCR § 916.9 [936.9, 956.9], subsection (g)(1). The following changes to 14 CCR § 916.9 [936.9, 956.9], subsection (g)(1)(B) are proposed:

~~(B) Field-based approaches to identify potential Class II-L: Determination of Class II-L watercourses shall be verified in the field by direct channel observations and local experience may be used to modify the office-based determinations, if supported by substantial evidence certified as accurate by a Registered Professional Forester and explained and justified using one or more of the following approaches.~~

**14 CCR § 916.9 [936.9, 956.9], subsection (g)(1)(B) 1. and (B) 2. Direct Observation**

The Board amended the initial proposal to make the direct observation date a clear standard, and emphasize direct observation need to provide certain and defensible identification. The amendments are indicated below.

1. ~~Determine by d~~Direct observation and documentation that there is no surface flow contribution to or by local knowledge of common mid-summer flow conditions if office mapped Class II L watercourses contribute flow a Class I watercourse later than at least through approximately July 15th following a year of with at least average precipitation and runoff as determined from the 30-year average precipitation data available from NOAA, USGS, or CAL FIRE.

2. A detailed analysis demonstrating that the water temperature in the Class I watercourse will not be significantly impacted by harvesting in the tributary watercourse's WLPZ. This can be accomplished using measured/estimated tributary and main stream flow data and water temperature data that are input into Brown's (1980) "mixing ratio" equation. Specifically, the adjusted water temperature in the receiving Class I watercourse is not to exceed either 62.1 degrees F presented as the Maximum Weekly Average Temperature (MWAT) or 64.4 degrees F presented as the Maximum Weekly Maximum Temperature (MWMt). Very minimal mid to late-summer tributary streamflow may not be ecologically significant, particularly when the water temperature in the main stream is well below known requirements for the listed anadromous salmonids present.

**14 CCR § 916.9 [936.9, 956.9], subsection (g)(1)(B) 2. Channel Characteristics**

The Board amended the initial proposal to delete the use of channel characteristics alone to field verify a large Class II watercourse, or to modify delineation of a large Class II watercourse. Approaches that rely on the use of geomorphic, hydrologic, and biological indicators of stream flow duration provide a more reliable method of determining flow characteristics.

The Board finds several flaws in the proposed use of channel characteristics including:

1. The proposed geomorphic indicators (i.e., channel characteristics) of channel width at bankfull stage, channel depth at bankfull stage, channel slope, and mean entrenchment ratio are not indicators of the seasonal persistence of flow;
2. The presence of springs or seeps is only one of perhaps 5 or 6 other possible hydrologic indicators of flow duration, which are not included;
3. The evidence and/or presence of aquatic animal and plant life should be linked to specific perennial, intermittent, or ephemeral taxa and life stage.
4. No criteria are provided for study reach selection. Flow characteristics often vary along the length of a stream, resulting in gradual transitions in flow duration. Recognizing that in many streams flow duration exists on a continuum, choosing the reach on which to conduct an assessment can influence the resulting conclusion about flow duration. An assessment as proposed should be made for a representative reach, rather than at one point of a stream. Based on experience, an adequate representative reach for this type of stream assessment would likely be equivalent to 35 - 40 channel widths of the stream and no less than 100 feet in length for narrow streams.
5. No criteria or considerations are provided regarding the influence of scale on the proposed indicators (i.e., channel characteristics/geomorphology, hydrologic and biological attributes). The most important type of variation between streams is simply the size of the stream. Streams develop different channel dimensions due to differences in flow magnitude, landscape position, land use history, and other factors. When assessing a stream, it is of paramount importance to consider scale when determining the strength of indicators.

**14 CCR § 916.9 [936.9, 956.9], subsection (g)(1)(B) 3 Continuous streamflow data**

The Board amended the initial proposal for using continuous streamflow data as a field-data approach for justifying modification of a large Class II watercourse delineation, and did not support its extrapolation to other basins as a way to make a field-based determination of large Class II watercourses. Using continuous streamflow data and extrapolating it to other headwater basins is not a reliable or practical approach for determining a Class II watercourse with mid-summer flow. Drainage area is only one of many highly variable factors influencing the relationship between drainage basins and seasonal persistence of surface flow. Relationships developed from a limited set of observations are unlikely to be reliable predictors throughout an eco-region. The following are the proposed amendments:

3. Use continuous temperature or streamflow monitoring data from the watercourse to determine existence of surface flow contribution to a Class I watercourse later than July 15th following a year of average precipitation and runoff as determined from the 30-year average precipitation data available from NOAA, USGS, or CAL FIRE. ~~headwater watercourses to~~

~~determine the watershed drainage area necessary to initiate mid-summer streamflow for a given ecoregion and extrapolate this data to other headwater basins in that ecoregion.~~

**14 CCR § 916.9 [936.9, 956.9], subsection (g)(1)(C) Large Class II determination**

The Board amended the initial proposal to delete the language proposed under 14 CCR § 916.9 [936.9, 956.9], subsection (g)(1)(C). Using the proposed office and field-based methods for determining a large Class II watercourse do not provide reliable delineation results as previously described. The deletion of 14 CCR § 916.9 [936.9, 956.9], subsection (g)(1)(C) requires the renumbering of the remaining subsections under this section of the rules.

**14 CCR § 916.9 [936.9, 956.9], subsection (g)(1)(E) Large Class II enhanced protection measures**

The Board amended the initial proposal to include the application of enhanced protection measures to the downstream 1,000 feet of a large Class II channel. Amendment deletes Optional Amendment 12 which limits the application of enhanced protection measures to the downstream 650 feet of a large Class II channel. The 1,000 foot distance for a large Class II watercourse from the junction with a Class I watercourse is a conservative approach supported by the literature. Watersheds with listed salmonids often have water temperature and sediment impairments and large woody debris deficits. The literature points out that shorter length buffers of 650 feet may be adequate to protect water temperature but that research is needed in California to validate this relationship. Other research (Sullivan et al. (1990) suggests buffer lengths of 1,969 feet for larger streams. Others find from studies outside of California that stream connectivity and cooling of water temperatures occurs within 500 to 1000 feet (Benda et al. 2008, Zwieniecki and Newton 1999). Because headwater streams have functions that are integral to the existence of downstream aquatic habitat, and the forest practice rules have not specifically identified these functions and provided measures to protect those functions specifically in the past, a more conservative approach is justified to help recover listed species of anadromous salmonids in California.

While the proposed rule language under 14 CCR § 916.9 [936.9, 956.9], subsection (g)(1)(E) designates the appropriate requirements for the downstream 1,000 feet of a large Class II – L channel, it is not clear what requirements apply to the remaining portion of the Class II – L watercourse to the point where it becomes a Class II – S or a Class III watercourse. The following amendments are proposed to clarify this ambiguity, and ensure the Board's intention that the remaining portion of the Class II – L receive the same protection as a Class II – S from the 1,000' point upstream to the point where the classification changes to a Class III.

~~(E)(D)~~ All Class II-L watercourses designated above shall incorporate requirements stated in 14 CCR § 916.9 [936.9, 956.9], (g)(2) for a minimum distance of 1,000 feet or total length of Class II-L, whichever is less, measured from the confluence with a Class I watercourse. All portions of a Class II – L watercourse extending upstream beyond 1,000 feet in length shall receive protection in conformance with 14 CCR §§ 916 [936, 956] through 916.7 [936.7, 956.7], in addition to the requirements listed under 14 CCR §§ 916.9 [936.9, 956.9] (g)(2)(A) and (B).

**14 CCR § 916.9 [936.9, 956.9], subsection (g)(1)(F) Map documentation**

The Board amended the initial proposal to clarify the term “Class II standard” on page 51, line 4, and uses the standard nomenclature “Class II-S”.

**14 CCR § 916.9 [936.9, 956.9], subsection (g)(1) – Identification of Large Class II watercourses - Optional Amendment 102**

The Board recognizes stakeholders’ and agency comments on the need to use a variety of both office and field based approaches to ensure appropriate delineation of Class II-large watercourses. Additionally, the Board considers the delineation distance of 650 feet from the confluence of a Class I watercourse to be within the range of distances identified in the scientific literature review. Refer to the ISOR of this regulation for documentation of this literature.

To address these perspectives, the Board has include as Optional Amendment 102 essentially the initially proposed rule language for this section as documented in the May 8<sup>th</sup>, 2009 regulatory proposal. Optional Amendment 102 would replace 14 CCR § 916.9 [936.9, 956.9], subsection (g)(1). Minor amendments were made as part of this Option which delete the term “method of Strahler” as the stream ordering office delineating method and replacing it with "stream ordering method defined in 14 CCR 895.1." Optional Amendment 102 also includes the 650 feet delineation distance.

**14 CCR § 916.9 [936.9, 956.9], subsection (g)(2) Class II WLPZ widths and operational requirements**

The Board amended the initial proposal with the following non-substantive corrections:

Amend the language on page 51, line 5 by adding “II” after “Class” in the section title text.

On page 51, line 8 revise as follows to correct a typo:

The width of the Core and Inner Zones vary depending on the ~~flowing~~ following three factors . . .

On page 51, line 10, the term “Class II standard” should be amended to use the nomenclature “Class II-S”.

On page 51, line 11, the term “coho salmon ESU” should be amended with the revised term “Coastal Anadromy Zone” for consistency with the related definitional change proposed by the Board.

#### **14 CCR § 916.9 [936.9, 956.9], subsections (g)(2) Figure 7**

The Board amended Figure 7 with a new graphic to improve the interpretative quality of the picture. The summary of the prescriptive requirements were also amended to reflect requirements proposed in this re-noticed proposal. Should the Board elect to revise the prescriptive requirements or select requirements contained in the “Optional Amendments” contained in the amended proposal in its final adoption, the content of the graphic would accordingly be revised. The figure and accompanying text in the initial proposal are deleted.

#### **14 CCR § 916.9 [936.9, 956.9], subsection (g)(2)(A) and (B) Core Zone and Inner Zone**

The Board amended the initial proposal to (i) revise 14 CCR § 916.9 [936.9, 956.9], subsection (g)(2)(A) and (B), (ii) delete Optional Amendment 13, and (iii) replace Option 13 with Optional Amendment 103.

#### **14 CCR § 916.9 [936.9, 956.9], subsection (g)(2) Table Y**

The Board amended the initial proposal on page 51, line 19, and page 52, line 2, to delete Table Y and replace it with a reformatted table. It would be relabeled as “Table 4” for indexing consistency. No prescriptive standards are modified by this amendment.

#### **14 CCR § 916.9 [936.9, 956.9], subsection (g)(2) (B) Inner Zone**

The Board amended the initial proposal on page 52, line 19, to make a non-substantive correction. This line indicated that the “The widths of the Inner Zone vary from 35 feet to 80 feet...”. This is corrected to state “The widths of the Inner Zone vary from 35 feet to 90 feet...” as correctly indicated in the Table on page 52, lines 5-9. Page 52, line 25, of the initial proposal was amended to reflect the relabeling of Table Y to Table 4.

#### **14 CCR § 916.9 [936.9, 956.9], subsection (g)(2) (A) and (B) Optional Amendment 13**



On page 52, lines 12-18, Table Y in Optional Amendment 13 is deleted. The requirements for Optional Amendment 13 are reinserted as Optional Amendment 103.

Optional Amendment 13, and its replacement Optional Amendment 103, do not highly contribute to achieving properly functioning salmonid habitat because they delete the Core Zone on Class II standard watercourses, reduce the width of the Core Zone on Class II –large watercourses, and reduce tree retention requirements in these zones. Retaining Core zone widths and protections will provide substantially enhanced resource protection from sediment and temperature effects and maintain functions of LWD and nutrient input. It is uncertain whether the Board will be able to achieve the goals and objectives of the T/I rules and for Class I watercourses without core zone protections for Standard Class II watercourses.

The ISOR (Board of Forestry 2009) for this rule package documents the science support for establishing the core zone to provide watershed products and protection to support anadromous salmonids and their habitat. In addition, the information provide to the Board by CAL FIRE and DFG indicated that increased levels of instream sedimentation can be very deleterious to Coho salmon and other salmonids by smothering developing eggs within redds, which increases egg mortality, and hindering the emergence of alevins, which reduces juvenile recruitment (Bisson and Bilby 1982; Crouse et al. 1981; Hall et al. 2004; McNeil and Ahnell 1964). Bank erosion can be a major source of instream sedimentation, which is elevated through the removal of protective bankside vegetation (SWC 2008). In the Harris River in Alaska, reduced egg mortality caused by sedimentation of spawning gravel was a principal cause of egg-to-fry mortality, with up to two to four times more fine sediment in the river during timber harvesting (McNeil and Ahnell 1964). SWC (2008) found that mechanical disturbance from management activities within about 30 feet of the channel will often produce and deliver sediment to stream channels.

#### **14 CCR § 916.9 [936.9, 956.9], subsection (g)(2)(B)1. Class II standard watercourses**

The Board amended the initial proposal on page 53, line 1, the term “Class II standard” should be amended to use the nomenclature “Class II-S”.

**1. Class II – S standard watercourses:** Any Class II – ~~S standard~~ watercourses shall receive protection in conformance with 14 CCR §§ 916 [936, 956] through 916.7 [936.7, 956.7], in addition to the requirements listed under 14 CCR §§ 916.9 [936.9, 956.9] (g)(2)(A) and (B).

#### **14 CCR § 916.9 [936.9, 956.9], subsection (g)(2)(B) 2. Class II large watercourses in the Coho salmon ESU**

The Board amended the initial proposal on page 53, line 5, to replace the term “coho salmon ESU” with the revised term “Coastal Anadromy Zone” for consistency with the related definitional change proposed by the Board.

**14 CCR § 916.9 [936.9, 956.9], subsection (g)(B) 2. (i) – Inner Zone**

The Board amended the subsection to require postharvest trees to increase in QMD only when commercial thinning is used. The amendment in effect eliminates the postharvest QMD increase for plans that use selection harvesting. The Board determined this was necessary to address public concerns that those landowners who use selection silviculture would eventually not be able to use selection systems because this system is based on retaining and harvesting trees of all age classes, not on increasing average tree diameter.

**14 CCR § 916.9 [936.9, 956.9], subsection (g)(B) 2. (iii) – Inner Zone Overstory canopy**

The Board amended this subsection by revising subsection (iii) and deleting Options 4 and 5, of the initial proposal on page 53, lines 11- 25.

The amendments to subsection (iii) incorporate an 80 percent overstory canopy for the Northern and Southern Forest practice districts of the coastal anadromy zone and a 70% overstory canopy for Northern and Southern Forest practice Districts. This recognizes the difference in forest type and geography of the Klamath region encompassed by the Northern Forest District.

As part of this amendment, the Board supported hardwood species retained in the inner zone canopy because they provide shade to the watercourse and nutrients to not only fish, but to other aquatic species, and provide habitat for terrestrial species, as well. However of the Board eliminated the requirement that some hardwood species, such as alder, be retained rather than others because the ecological setting has primary influence over the hardwood species present.

**14 CCR § 916.9 [936.9, 956.9], subsection (g)(B)2. (iv) Large conifer tree retention**

The Board found the initial proposed rule will better promote meeting the objectives of the Core and Inner zones specified in 14 CCR § 916.9 [936.9, 956.9], subsections (c)(1) and (2) respectively, especially those regarding LWD recruitment. Retaining more of the largest conifers will provide more late seral habitat for wildlife over time.

One potential problem with the language in this section is that it could be interpreted to mean that the 26 largest conifers located within the area that encompasses the Core and inner zones must be retained (i.e., 13 in each zone). This is not the intention of the Board. The following language changes on page 54, line 2, clarify that the intent is to retain the 13 largest trees per on each acre throughout core and inner zones:

Postharvest stand shall retain the 13 largest conifer trees (live or dead) on each acre of the area that encompasses the Core and Inner Zones.

The Board amended the initial proposal for this subsection to delete Optional Amendment 6 on page 54, lines 4-10 that allows substitution of smaller trees for LWD retention. Although there may be some situations where smaller trees that are closer and leaning toward the channel are more likely to recruit to the stream, this could undermine the other functions provided in the inner zone. Evaluating the impact of smaller tree substitutions would lengthen THP review. The retention of large diameter, and hence older, trees is considered more desirable for protecting salmonid habitat because mature trees will contribute a greater supply of LWD, increased shading and will promote bank stability much more than smaller diameter trees (SWC 2008). Source distance relationships for riparian functions support the concept of near-stream silvicultural prescriptions being driven by factors which emphasize retention and/or recruitment of large trees to facilitate riparian functions (SWC 2008). Lienkaemper and Swanson (1987), as cited in Cummins (1994) suggest that approximately 10 mature conifer trees per 100 meters of stream are needed to achieve debris loading similar to that in a mature forest stream system. SWC (2008) stated that to facilitate long-term recruitment of large wood loading in streams, management should encourage the development and retention of large trees in the near stream riparian zone.

**14 CCR § 916.9 [936.9, 956.9], subsection (g)(2)(B) 2. (v) Large tree recruitment**

The amended this subsection in order to clarify that subsection (v) should more properly apply to subsection (i)-(iii), not (iv), and provide more examples for selecting trees for retention.

“Large trees retained to meet 14 CCR § 916.9 [936.9, 956.9], subsections (g)(2)(B)2.-(iv)(i-iii) above that are the most conducive to recruitment to provide for the beneficial functions of riparian zones (i.e., e.g., trees with significant that lean towards the channel, have an unimpeded fall path toward the watercourse, are in an advanced state of decay, are located on unstable areas or downslope of such an unstable areas, or have undermined roots) are to be given priority to be retained as future recruitment trees.”

The amendment also replaces “with significant” with “that” on page 54, line 11 in order to remove vagueness about what is a significant lean or not. This will facilitate more efficient project review.

**14 CCR § 916.9 [936.9, 956.9], subsection (g)(2)(B)2. (vi) Angular Canopy Density**

The Board amended the initial proposal to delete Optional Amendment 7 that adds an 80% angular canopy requirement. This deletion is consistent with other previous disclosures on the deletion of ACD.

**14 CCR § 916.9 [936.9, 956.9], subsection (g)(2)(B)2. (vii) Post harvest basal area for inner zone.**

The Board amended the initial proposal to delete Optional Amendment 8 that adds a basal area requirement to the inner zone. The Board has not validated whether these basal area standards are adequate, too restrictive, or provide for the riparian functions that support salmonid habitat. The proposed language for 80% canopy in 14 CCR § 916.9 [936.9, 956.9], subsection (g)(2)(B)2.(iii) is adequate and simpler to apply and measure than basal area.

**14 CCR § 916.9 [936.9, 956.9], subsection (g)(2)(B) 3. Class II watercourses outside watersheds in the Coho salmon ESU**

The Board amended the initial proposal title to replace the term “coho salmon ESU” with the revised term “Coastal Anadromy Zone” for consistency with the related definitional change proposed by the Board.

**14 CCR § 916.9 [936.9, 956.9], subsection (g)(2)(B) 3. (i) – Inner Zone**

The Board amended the subsection to require postharvest trees to increase in QMD only when commercial thinning is used. The amendment in effect eliminates the postharvest QMD increase for plans that use selection harvesting. The Board determined this was necessary to address public concerns that those landowners who use selection silviculture would eventually not be able to use selection systems because this system is based on retaining and harvesting trees of all age classes, not on increasing average tree diameter.

**14 CCR § 916.9 [936.9, 956.9], subsection (g)(2)(B) 3. (iii) – Inner Zone Overstory canopy**

The Board amended this subsection by revising subsection (iii) and deleted Options 4 and 5, of the initial proposal on page 55, lines 18- 25, and page 56, lines 1-2.

The amendments to subsection (iii) on page 55, line 22, eliminated the requirement that some hardwood species, such as alder, be retained rather than others because the ecological setting has primary influence over the hardwood species present.

**14 CCR § 916.9 [936.9, 956.9], subsection (g)(2)(B)3. (iv) Large conifer tree retention**

The Board found the initial proposed rule will better promote meeting the objectives of the Core and Inner zones specified in 14 CCR § 916.9 [936.9, 956.9], subsections (c)(1) and (2) respectively, especially those regarding LWD recruitment. Retaining more of the largest conifers will provide more late seral habitat for wildlife over time.

One potential problem with the language in this section is that it could be interpreted to mean that the 14 largest conifers located within the area that encompasses the Core and inner zones must be retained (i.e., 7 in each zone). This is not the intention of the Board. The following language changes on page 56, line 4, clarify that the intent is to retain the 13 largest trees per on each acre throughout core and inner zones:

Postharvest stand shall retain the 7 largest conifer trees (live or dead) on each acre of the area that encompasses the Core and Inner Zones.

The Board amended the initial proposal for this subsection to delete Optional Amendment 6 on page 56, lines 4-10 that allows substitution of smaller trees for LWD retention. Although there may be some situations where smaller trees that are closer and leaning toward the channel are more likely to recruit to the stream, this could undermine the other functions provided in the inner zone. Evaluating the impact of smaller tree substitutions would lengthen THP review. The retention of large diameter, and hence older, trees is considered more desirable for protecting salmonid habitat because mature trees will contribute a greater supply of LWD, increased shading and will promote bank stability much more than smaller diameter trees (SWC 2008). Source distance relationships for riparian functions support the concept of near-stream silvicultural prescriptions being driven by factors which emphasize retention and/or recruitment of large trees to facilitate riparian functions (SWC 2008). Lienkaemper and Swanson (1987), as cited in Cummins (1994) suggest that approximately 10 mature conifer trees per 100 meters of stream are needed to achieve debris loading similar to that in a mature forest stream system. SWC (2008) stated that to facilitate long-term recruitment of large wood loading in streams, management should encourage the development and retention of large trees in the near stream riparian zone.

**14 CCR § 916.9 [936.9, 956.9], subsection (g)(2)(B) 3. (v) Large tree recruitment**

The Board amended this subsection in order to clarify that subsection (v) should more properly apply to subsection (i)-(iii), not (iv), and provide more examples for selecting trees for retention.

“Large trees retained to meet 14 CCR § 916.9 [936.9, 956.9], subsections (g)(2)(B)3.-(iv)-(i-iii) above that are the most conducive to recruitment to provide for the beneficial functions of riparian zones (i.e. e.g., trees with significant that lean towards the channel, have an unimpeded fall path

toward the watercourse, are in an advanced state of decay, are located on unstable areas or downslope of such an unstable areas, or have undermined roots) are to be given priority to be retained as future recruitment trees.”

The amendment also replaces “with significant” with “that” on page 56, line 13 in order to remove vagueness about what is a significant lean or not. This will facilitate more efficient project review.

**14 CCR § 916.9 [936.9, 956.9], subsection (g)(2)(B)3. (vi) Angular Canopy Density**

The Board amended the initial proposal to delete Optional Amendment 7 that adds an 80% angular canopy requirement. This deletion is consistent with other previous disclosures on the deletion of ACD.

**14 CCR § 916.9 [936.9, 956.9], subsection (g)(2)(B)3. (vii) Post harvest basal area for inner zone.**

The Board amended the initial proposal to delete Optional Amendment 8 that adds a basal area requirement to the inner zone. The Board has not validated whether these basal area standards are adequate, too restrictive, or provide for the riparian functions that support salmonid habitat. The proposed language for 80% canopy in 14 CCR § 916.9 [936.9, 956.9], subsection (g)(2)(B)3.(iii) is adequate and simpler to apply and measure than basal area.

**14 CCR § 916.9 [936.9, 956.9], subsection (g)(2) Optional Amendment 103.**

The Board amended the initial proposal to add Optional Amendment 103. It is similar to Option 13 in that it eliminates Core Zone protections for Standard Class II watercourses and reduces the Core Zone widths by five feet (and therefore increases the Inner Zone width) on Class II-large watercourses. Optional amendment 103 would replace the initially proposed language in 14 CCR § 916.9 [936.9, 956.9], subsection (g)(2) on pages 51-57.

Optional Amendment 103 includes requirements for Class II-Standard watercourses for retaining trees that provide bed and bank stability for the watercourse and prohibits sanitation salvage silvicultural methods. This requirement is similar to providing for the function of the ‘Core Zone’, but likely at a lesser beneficial level.

Optional Amendment 103 establishes a 60% total canopy cover for all Class II-L watercourses in the coastal anadromy zone. This level of overstory canopy retention has not been demonstrated to provide for properly functioning habitat needs. It is essential to maximize canopy retention to provide essential shade to the stream channel, moderating water temperature and primary productivity (Beschta et al. 1987; Hicks et al. 1991). A reduction of post harvest canopy closure from 80% overstory

canopy to 60% total canopy in the inner zone is contrary to the intent of the rule which is to protect water temperatures by maintaining shade and protect riparian habitat. Coho salmon, being at the southern limit of their range in California, are particularly susceptible to increases in water temperature through reductions in shade (Beschta et al. 1987; Sullivan et al. 2000; Welsh et al. 2001). Welsh and others (2001) found that Coho salmon distribution in the Mattole River was strongly correlated with water temperature, with Coho distribution being limited largely by high water temperatures. Similarly, Madej et al. (2006) found that summer high water temperatures in the middle reaches of Redwood Creek, where extensive forest management and riparian clearance has been carried out, were limiting to Coho salmon distribution.

Optional Amendment 103 establishes postharvest large tree retention requirements for the Class II-L inner zone at levels of 7 trees per acre for the coastal anadromy zone and 4 trees per acre for watershed outside the coastal anadromy zone. These levels are a 50% reduction the Class II large standards proposed for Class II large watercourses in 14 CCR § 916.9 [936.9, 956.9], subsection (g)(2). Scientific information does not provide a basis for this requirement, particularly for the coast areas where substantial quantities of large wood are found in streams.

#### **14 CCR § 916.9 [936.9, 956.9], subsection (g) (3) Class II watercourses in the Southern Subdistrict of the Coast Forest District**

A new subsection is added to address requirements for Class II watercourses in the Southern Subdistrict (SSD) of the Coast Forest District. This subdistrict has a unique set of existing forest practice regulations contained in the various county rules, Southern Subdistrict rules, and when applicable, rules for watersheds with coho salmon found in 14 CCR § 916.9.2 [936.9.2, 956.9.2]. These existing regulations have been observed to provide similar postharvest conditions as is intended by the application of the proposed Class II watercourse regulations for watersheds with listed anadromous salmonids.

This proposal would only be appropriate if the Board adopts the Class I WLPZ prescription with a 30' no-harvest core zone and a 70' inner zone with 80% overstory canopy retention; and retention of existing County rules specified under Article 13 of the Forest Practice Rules. The proposed requirements include a title, an introductory statement to clarify where the rules apply, and the prescriptive standards for all Class II watercourses in the SSD.

#### **14 CCR § 916.9 [936.9, 956.9], subsection (h), Class III Protections**

The Board amended the initial proposal on page 59, line 13, to delete redundant language. This section does not need to indicate these protection measures apply in watersheds with listed anadromous salmonids because all of the protection measures described in 916.9 apply therein.

**(h) Class III watercourses –**

The following are the minimum requirements for timber operations in Class III watercourses in watersheds with listed anadromous salmonids, unless explained and justified in the plan and approved by the Director.

**14 CCR § 916.9 [936.9, 956.9], subsection (h)(1)(C), Class III Protections**

The Board amended the initial proposal on page 59, lines 20-22, under (C), for the limitation to stable tractor roads without visible evidence of sediment deposition to the adjacent channel. This language is not grammatically correct, as the tractor road does not deposit sediment.

(C) ground-based operations are limited to existing stable tractor roads that show no visible evidence of sediment deposition being transported into the adjacent watercourse. ~~without visible evidence of sediment deposition to the adjacent channels zone~~ or to the use of feller- bunchers or shovel yarding.

**14 CCR § 916.9 [936.9, 956.9], subsection (h)(2)**

The Board amended the initial proposal on page 60, lines 1-4, to deleted Optional Amendment 15. Removal of watershed products from the ELZ will reduce the amount of watershed products provided by headwater streams and compromise the capacity headwater streams to provide such products. Without functioning headwater streams and their watershed products, the Board will limit its ability to meet the restoration and recovery goals of the Joint Policy and will not achieve the goals of the T/I rules.

Under Optional Amendment 15, retaining only non-merchantable wood would eliminate the supply of large wood which is more effective at stabilizing sediment, and also provides a valuable source of LWD for the stream. The *Aquatic Conservation Strategy* (ACS) of the Northwest Forest Plan (PNW Plan) stated that headwater riparian areas need to be protected, so that when debris slides and flows occur, they contain coarse woody debris and boulders necessary for creating habitat farther downstream (Everest and Reeves 2007).

Reeves (2006) stated that since the ACS was implemented, new scientific information has become available which underlines the importance of protecting headwater streams from disturbances. Cummins and Wilzbach (2006) discussed the inadequacy of the fish-bearing criterion for stream management and forest management practices and suggest that the importance of intermittent, ephemeral, and very small first order channels as suppliers of invertebrates and detritus to permanently flowing, receiving streams that support juvenile salmonids warrant their protection during timber harvest.



It was concluded that criteria other than the presence or absence of juvenile salmonids need to be considered in managing forested watersheds.

**14 CCR § 916.9 [936.9, 956.9], subsection (h)(4)**

The Board amended the initial proposal to provide retention of hardwoods within the entire width of the ELZ as proposed in Optional Amendment 17. This option retains hardwood in the entire ELZ width regardless of slope. The Board deleted Optional Amendment 16, which limits hardwood retention to non-merchantable trees and the initially proposed language in (4) which retained hardwoods for 30 feet within the ELZ. Hardwoods provide rainfall energy dissipation, root strength, and nutrients to watercourses. The 1999 Scientific Review Panel report (Ligon et al. 1999) recommended retaining hardwoods for salmonid habitat protection. Steeper slopes are more prone to sliding and delivering sediment to watercourses. Hardwood tree roots and leaf litter protect such slopes and may prevent slope erosion and failure.

The Board amended the initial proposal for this subsection by adding Optional Amendment 104. This Option would retain hardwoods for a distance of 25 ft from the WTL of the ELZ instead of the proposed entire width of the ELZ (30 feet to 50 feet depending on slope). The option does not provide the level of environmental benefits as Option 17.

**14 CCR § 916.9 [936.9, 956.9], subsection (h)(6)**

The Board amended the initial proposal to delete the language in (h)(6) and Optional Amendment 18, replace it with Optional Amendment 19. The language in (h)(6) and Option 18 limited retention of all countable trees needed to achieve resource conservation standards to just within the 30 foot ELZ and limited retention to non merchantable trees respectively. Optional Amendment 19 requires standards be applied within the entire ELZ. Optional Amendment 19 provides for substantial recruitment of LWD and small woody material in the ELZ. Option 19 most highly promotes advanced regeneration of trees that will provide LWD and small woody debris for sediment retention and erosion prevention in Class III streams, and possible movement into larger fish bearing watercourses.

The Board amended the initial proposal to include Optional Amendment 105. This option would require retention of all “non-merchantable conifers” in the ELZ. This option likely provides for the retention of substantial “advanced regeneration” that will support riparian function mentioned above without requiring trees of commercial value to be retained.

**14 CCR § 916.9 [936.9, 956.9], subsection (h)(7)**

The Board amended the initial proposal on page 60, lines 20-23, under (7), for grammatical clarity. This is a non-substantive change.

**14 CCR § 916.9 [936.9, 956.9], subsection (k) Year-round road, landing use limitations**

The Board amended the initial proposal to include a requirement for hydrologic disconnection for logging roads and landings in subsection 14 CCR § 916.9 [936.9, 956.9], subsection (k)(2), as follows:

(2) Log hauling on logging roads and landings shall be limited to those which are hydrologically disconnected from watercourses to the extent feasible, and exhibit with a stable operating surface in conformance with (1) above.

Years of field observations of roads associated with timber harvesting plans by DFG Environmental Scientists and CAL FIRE inspectors, documented in preharvest inspection reports, clearly demonstrate that hydrologic disconnection, when used in concert with elimination of diversion potential, does more to prevent or reduce chronic fine road and landing sediment input into anadromous salmonid spawning, rearing, and overwintering habitat from roads and landings than any other Forest Practice Rule associated with road and landing use. The term is currently well understood by Registered Professional Foresters and agency personnel.

**14 CCR § 916.9 [936.9, 956.9], subsection (l)(1)-(4) Winter period operations**

The Board amended the initial proposal to amend the title of the subsection to “Extended Wet Weather Period” to avoid confusion with the establishment of a new “winter period” as defined in 14 CCR 895.1. As was described in the recommended amendment to the definition of winter period, the Board’s Road Rules Committee recommendation was not intended to result in new imposition of activities and additional significant costs to the landowner and operators as a result of creating an expanded winter period definition for T/I watersheds. It was to reorganize and consolidate existing requirements in the T/I rules for the wet weather periods. To ensure this intended purpose, and avoid confusion of regarding actions needed during the “winter period”, the proposed amendment on page 63, line 8 is recommended:

**(l) Extended Wet Weather Period ~~Winter period operations~~**

On page 63, lines 19-20, use “and” rather than “or” in two places to make the list more inclusive. Also grammatical corrections are made on line 19 to eliminate extra spaces:

~~From~~ October 15 to May 1 shall be considered the extended wet weather period and the following shall apply:

(1) No timber operations shall take place unless the approved plan incorporates a complete winter period operating plan pursuant to 14 CCR § 914.7 [934.7, 954.7] subsection (a) that specifically addresses, where applicable, proposed logging road=, landing= or tractor road construction, reconstruction and use during the extended wet weather period. Where logging road watercourse crossing construction or reconstruction is proposed an implementation schedule shall be specified.

(2) Unless the winter period operating plan proposes operations during an extended wet weather period with low antecedent soil wetness, no tractor roads shall be constructed, reconstructed, or used on slopes that are over 40 percent and within 200 feet of a Class I, II, or III watercourse, as measured from the watercourse or lake transition line during the extended wet weather period. and

**14 CCR § 916.9 [936.9, 956.9], subsection (n)(1)-(7) Treatments to stabilize soils**

The Board amended the initial proposal to incorporate Optional Amendments 20, 21, 22, and 23. The Optional Amendments retain important soil stabilization treatments proposed for deletion and provide appropriate new measures to address one of the most problematic environmental issues related to timber operations.

**14 CCR § 916.9 [936.9, 956.9], subsection (r) Water Drafting**

The Board amended the initial proposal to (i) add consistency with DFG stream alteration permitting statutory requirements, (ii) delete Optional Amendment 25, (iii) reduce the minimum suction screen surface from 3.0 square feet to 2.5 square feet, (iv) add other non-substantive changes, and (v) add Optional Amendment 106 which retains the existing water drafting language unchanged as currently found in the T/I rules under 14 CCR 916.9[936.9,956.9], subsection (r).

To provide consistency with DFG requirements and Fish and Game Code (FGC) statutes in FGC § 1600 et seq., amendments were made on page 67 lines 8, 9, and 14. The phrase “Require notification.... FGC § 1600 et seq” was deleted and replaced with “Comply with FGC § 1600 et seq”. This change makes the section consistent with DFG code sections that only require notification of stream alteration for substantial diversions, not every diversion.

Optional Amendment 25 is deleted because it does not require notification for all water drafting for timber operations. Optional amendment 14 CCR § 916.9 [936.9, 956.9], subsection (r)(1) states that water drafting shall comply with FGC § 1600 et seq. “where

applicable”, which incorrectly implies that there are locations where water drafting might be conducted to which the statute does not apply. This language is not consistent with FGC § 1600 et seq. The statute is clear that it applies to any river, stream or lake in California for an activity that will substantially modify a river, stream or lake. If DFG determines that the activity may substantially adversely affect fish and wildlife resources, a Lake or Streambed Alteration Agreement will be prepared. The Agreement includes reasonable conditions necessary to protect those resources and must comply with CEQA. Subsection 14 CCR § 916.9 [936.9, 956.9], subsection (r)(1)(A) of the proposed amended language confirms that timber operations under existing master or long-term Lake and Streambed Alteration agreements (agreement) may provide that agreement with the plan for compliance with the notification requirement. Optional amendment 14 CCR § 916.9 [936.9, 956.9], subsection (r)(2) could be interpreted to mean that if a plan proposes water drafting under an existing agreement, that agreement can be made part of the plan. The optional language does not specify that the plan submitter and the holder of the agreement must be the same. In other words, an existing agreement cannot be transferred to a different plan submitter that proposes to use the same water drafting location. DFG already allows use of existing agreements by the same landowner and requires the agreement be disclosed in the new THP. Language could be added to the amendment which acknowledges existing individual water drafting agreements in the proposed rule along with acknowledgement of existing master and long-term agreements.

Secondly, 14 CCR § 916.9 [936.9, 956.9], subsection (r)(2) provides a comprehensive list of information to be gathered and submitted with the plan. Recall that the THP can act as the notification under FGC § 1611, which was adopted to reduce duplication of information and improve permitting efficiency. Many plan submitters take advantage of this option. This information list will allow review team agencies and the public to evaluate proposed water drafting impacts. The language does not require a new notification for water drafting locations that already operate under an agreement. However, disclosure of the use of existing permitted sites to be used under a new THP, and also other locations in the same watershed whether or not FGC § 1611 notification is provided to DFG provides adequate information in the THP for lead and reviewing agencies to evaluate cumulative impacts and fulfill the disclosure requirements of CEQA. Optional Amendment 25 does not contain a complete list of the types of information that DFG or CalFire needs to evaluate a notification for water drafting or water drafting impacts in general, which would delay review of the THP or separate 1600 notification while DFG or CalFire requests the information and waits for the plan submitter to provide it.

Thirdly, 14 CCR § 916.9 [936.9, 956.9], subsection (r)(3) provides a set of requirements for water drafting operations that provide a minimum set of conditions to ensure aquatic resources are protected under the FPRs. If DFG determines that substantial adverse impacts would occur, these requirements would be incorporated into the agreement or modified by the agreement, or additional conditions could be added in the agreement depending on the site. Then, the agreement would take precedence over the requirements of the rule. Requirements in 14 CCR § 916.9 [936.9, 956.9], subsections

(r)(3)(A)(1) – (5) are standard screening criteria for protection of juvenile salmonids, which have been promoted by DFG since 2000 and are currently included in all THPs in T/I watersheds in DFG's Northern Interior Region where water drafting from Class I watercourses occurs. Requirements in 14 CCR § 916.9 [936.9, 956.9], subsections (r)(3)(C) and (D) are additional to the existing rule. The requirement in 14 CCR § 916.9 [936.9, 956.9], subsection (r)(3)(C) for sediment control, for example, where there is insufficient rocking or the pad slopes directly to the watercourse, should be required for water drafting activities to promote compliance with FGC § 5650, which regulates water pollution from prohibited materials including petroleum products, wood byproducts, or any substance or material deleterious to fish, plant life, or wildlife. The requirement in 14 CCR § 916.9 [936.9, 956.9], subsection (r)(3)(D) for use of drip pans to capture and contain vehicle fluids also promote compliance with FGC § 5650. These two sets of requirements, along with the other requirements in 14 CCR § 916.9 [936.9, 956.9], subsection (r)(3), are already general conditions of agreements issued by DFG, which promotes the Board's goal to provide consistency with other agency's requirements.

Fourth, Optional Amendment 25 does not include the minimum protection measures that DFG requires in agreements, such as those identified above, and eliminates the requirement for a log book altogether, and therefore does not help the Board meet the goal for consistency with other agency's requirements.

The Board amended the initial proposal to change the surface area requirement in 14 CCR § 916.9 [936.9, 956.9], subsection (r)(3)(A)(2) from 3.0 square feet to 2.5 square feet of openings. DFG's screening guidelines (CDFG 2000) specify that the screen surface shall have at least 2.33 square feet of openings and National Marine Fisheries Service (NMFS) screening guidelines (NMFS 2001) requires at least 2.5 square feet based on the upper limit of pumping. NMFS's screen size criteria will offer sufficient protection of juvenile salmonids.

The Board amended the initial proposal for several non substantive amendments. 14 CCR § 916.9 [936.9, 956.9], subsection (r)(3)(E), on page 69, line 12, is corrected to specify that the 2 cubic feet per second (cfs) bypass flows is required. The "per second" rate was inadvertently not included in the initial proposal. It also added "Class I watercourses" to make specific the locations where these requirements are necessary. On page 69, line 16, 916.9(r), Water Drafting, put a comma between "drafted" and "the date." The changes on page 69, lines 10-13 to address these issues:

(E) Bypass flows for Class I watercourses shall be provided in volume sufficient to avoid dewatering the watercourse and maintain aquatic life downstream, and shall conform to the following standard:

1. Bypass flows in the source stream during drafting shall be at least 2 cubic feet per second.

2. Diversion rate shall not exceed 10 percent of the surface

flow.

**3. Pool volume reduction shall not exceed 10 percent.**

The Board amended the initial proposal to include Optional Amendment 106, which reintroduces the existing T/I rule language currently contained in 14 CCR 916.9[936.9,956.9], subsection (r). The option was added as the Board wanted to provide full opportunity for the public to comment on this option.

**14 CCR § 916.9 [936.9, 956.9], subsection (s)(5) Exemption Notices**

The Board amended the initial proposal to revise 14 CCR § 916.9 [936.9, 956.9], subsection (s)(5) as follows in order to conform the rule with FGC § 1600 et seq.

(5) ~~Temporary crossings of dry Class III watercourses which that do not~~  
require “Streambed Alteration Agreement” notification under Fish and  
Game Code §1600 et seq.

This would clarify that FGC § 1600 et seq. requires notification to DFG when substantial alterations to bed, bank and channel are proposed. DFG uses the notification to then evaluate the project's adverse impacts and determine whether or not a Lake and Streambed Alteration Agreement will be necessary. The existing rule language incorrectly describes the requirement under the FGC.

**14 CCR § 916.9 [936.9, 956.9], subsection (t)(5)**

The Board amended the initial proposal to revise 14 CCR § 916.9 [936.9, 956.9], subsection (t)(5) as follows in order to conform the rule to FGC § 1600 et seq.

(5) ~~Temporary crossings of dry Class III watercourses which that do not~~  
require “Streambed Alteration Agreement” notification under Fish and  
Game Code §1600 et seq.

This would clarify that FGC § 1600 et seq. requires notification to DFG when alterations to bed, bank and channel are proposed. DFG uses the notification to then evaluate the project's adverse impacts and determine whether or not a Lake and Streambed Alteration Agreement will be necessary. The existing rule language incorrectly describes the requirement under the FGC.

**14 CCR § 916.9 [936.9, 956.9], subsection (t)(7)(A)**

The Board amended the initial proposal to revise the conditions for logging under emergency notices in watersheds with listed anadromous salmonids:

(7) The harvest of dead or dying conifer trees subject the following conditions:

(A) Retention of all trees in the core zone of Class I and Class II-L watercourses. ~~Recruitment of large woody debris for aquatic habitat in Class I and Class II-L anadromous fish bearing or restorable WLPZs shall be ensured by retaining the ten 13 largest dbh conifers (live or dead) per 330 feet of stream channel length acre for plans in watersheds in the coho salmon ESU and 7 largest dbh conifers (live or dead) per acre in watersheds outside the coho salmon ESU, that are the most conducive to recruitment to provide for the beneficial functions of riparian zones. The retained conifers shall be selected from within the area of operations that lies within 50 feet of the watercourse transition line. Where the area of operations is bounded by an ownership boundary that corresponds with a class I watercourse, and where the WLPZ on both sides of the watercourse currently meets the stocking standards listed under 14 CCR § 912.7 [932.7, 952.7](b)(2), the five (5) largest dbh conifers (live or dead) per 330 feet of stream channel length that are the most conducive to recruitment to provide for the beneficial functions of riparian zones shall be retained within 50 feet of the watercourse transition line within the area of operations.~~

~~The RPF may provide alternatives to substitute smaller diameter trees, trees that are more than 50 feet from the watercourse transition line, or other alternatives on a site specific basis. The RPF must provide with the notice an explanation and justification why the alternative provided is more conducive to current and long term Llarge Wwoody Ddebris recruitment, shading, bank stability, and the beneficial functions of riparian zones.~~

(B) Within any ....

Emergency timber operations (per 14 CCR § 1052) are not subject to a focused interagency environmental review, so their potential impacts to salmonids cannot be fully evaluated to determine if the standard measures for protection are adequate to prevent take of a species. Therefore, the risk of impacts should be commensurately low

or non-existent. This subsection is intended to condition operations conducted under an emergency notice from the zones established to protect water-related values; requiring the retention of a certain level of stocking, and a certain number of dead trees for LWD recruitment and wildlife habitat.

To address these needs, the Board amended the subsection retaining all trees in the core zone of the Class I and Class II-L streams to highly address these functions and to also contribute to reducing risks of sediment production/discharge in locations closest to the stream.

**14 CCR § 916.9 [936.9, 956.9], subsection (v)(1)**

The Board amended the initial proposal on page 75, lines 21-22, to make clear that site-specific proposals pertain exclusively to watersheds with listed anadromous salmonids pursuant to 14 CCR § 916.9 [936.9, 956.9] only. To clarify this, add the text "...in place of any of the provisions contained in this section..." after "...nonstandard operational provisions..." on line 22 and add punctuation to reduce run-on sentence length as shown below:

(1) In consideration of the spatial variability of the forest landscape, the RPF may propose site-specific measures or nonstandard operational provisions in place of any of the provisions contained in this section. Site specific plans may be submitted when, in the judgment of the RPF, such measures or provisions offer a more effective or more feasible way of achieving the goals and objectives set forth in 14 CCR § 916.9 [936.9, 956.9], subsections (a) and (c), and would result in effects to the beneficial functions of the riparian zone equal to or more favorable than those expected to result from the application of the operational provisions required under 14 CCR § 916.9 [936.9, 956.9].

**14 CCR § 916.9 [936.9, 956.9], subsection (v) (2), Site Specific Plan**

The Board amended the initial proposal on page 76, lines 13 to clarify the types of site specific plans and the review process for them. The review process involves either submittal of an "evaluation of the beneficial functions" intended for larger complex proposals, or DFG concurrence for projects with limited scope. The amended language further clarifies the project types and review process and states that those projects with limited scope must have written concurrence from DFG, not just consultation. The proposed amendments also add an opportunity to request a preconsultation with agencies, to ensure early review from agencies that result in successful developments of a site specific plan.



**14 CCR § 916.9 [936.9, 956.9], subsection (v) (3), Site Specific Plan**

The Board amended the initial proposal for a non-substantive change on page 76, line 17, to add "-ly" to "appropriate" to make it an adverb.

**14 CCR § 916.9 [936.9, 956.9], subsection (v) (3)(A), Site Specific Plan**

The Board amended the initial proposal to add monitoring requirements established in 916.11 as a component of all site specific plans. This requirement is added as item 7. on page 77, line 17 of the initial proposal.

**14 CCR § 916.9 [936.9, 956.9], subsection (v)(4)(F) Site Specific Plan**

The Board amended the initial proposal for a grammatical change to change "which" to "that" on Page 78, Line 9.

**14 CCR § 916.9 [936.9, 956.9], subsection (v)(5) Site Specific FPA plans**

The Board inserted into this section the deleted language from 14 CCR § 916.9 [936.9, 956.9], subsection (f)(4). The FPA site specific plan is located in this subsection to reduce confusion and duplication and provides consistency for all site specific plans.

Insertion of this new subsection results in the need to re-index each of the subsequent subsection in 14 CCR § 916.9 [936.9, 956.9], subsection (v) from (v)(6) through (v) (10).

**14 CCR § 916.9 [936, 956], subsection (v)(6) Site Specific Plan**

The Board inserted into this subsection the deleted language from related to the prescriptive standards of the fire hazard reduction objectives in 14 CCR § 916.9 [936.9, 956.9], subsection (c). Placing these in this subsection is appropriate as there are many complexities in assessing appropriate hazard reduction projects and making consistent the fuel hazard reduction with the other objectives of the riparian areas.

The Board amended the initial proposal to add Optional Amendment 107. This option eliminates the goal for site specific fuel hazard reduction plans to achieve post harvest conditions of "maximum four foot flame lengths". While this goal helps guide plans to obtain fire-resilient forest conditions, the goal is difficult to enforce.

(A) For site specific plans that address WLPZs having conditions where catastrophic, stand replacing wildfire will result in significant adverse effects to salmonid species, riparian habitat or other wildlife species, the site specific plan shall address measure(s) or provision(s) that create fire resilient forests, promote reduced fire intensities, and retain functional

habitat following a wildfire. Site specific plans proposed for fuel hazard reduction shall contain information demonstrating the potential for severe fire behavior and likelihood of stand replacing fires. Fuel reduction measure(s) or provision(s) shall be designed to reduce fire behavior to levels appropriate for the region and riparian area. Measure(s) or provision(s) include, but are not limited to, activities that result in maximum four-foot flames lengths under average severe fire conditions. [Optional Amendment 107 deletes: ...result in maximum four-foot flames lengths under average severe fire conditions....] eliminate the vertical and horizontal continuity among all vegetative fuels layer (surface fuels, ladder fuels and crown fuels), focus on reducing surface and ladder fuel hazards, and simultaneously meet goals and objectives of 14 CCR § 916.9 [936.9, 956.9] subsections (a) and (c).

**14 CCR § 916.9 [936.9, 956.9], subsection (v)(6)**

The Board amended the initial proposal to re- index it as subsection (v)(8) as previously described to accommodate a new subsections on site specific flood prone area plans and site specific fire hazard reduction plans. Additionally, on page 79 line 2 of the initial proposal, amendments were made to provide for the approval process to include concurrence from DFG. This is needed as confidence about the results of site specific analyses and models and how those results are translated into measures that protect and restore salmonid habitat will require establishing parameters and guidance for regulators, plan submitters and analysts. Further, DFG cannot delegate oversight of take for state listed species such as coho salmon, and plans using a site-specific analysis to determine protective measures will need to be evaluated for take.

The Board amended the initial proposal for a non substantive spelling correction on page 79, line 5, of the initial proposal.

The Board amended the initial proposal to delete 28 because it does not retain provisions for nonconcurrence from two or more review team agencies, including DFG, that the proposed alternative will not meet the goal of this section, requiring CAL FIRE to not approve the alternative. This could lead to the Director's conclusion that the proposed alternative will not meet the goals of this section.

**14 CCR § 916.9 [936.9, 956.9], subsection (v)(7) Site Specific Plan:**

The Board amended the initial proposal to re-index it as subsection (v)(9) as previously described to accommodate a new subsections on site specific flood prone area plans

and site specific fire hazard reduction plans. A non substantive typo correction was made on page 80, line 7, of the initial proposal. The section number should be changed from 916.9 to 916.6.

**14 CCR § 916.9 [936.9, 956.9], subsection (v)(10) Site Specific Plan:**

The Board amended the initial proposal to add subsection (v)(1). This subsection includes implementing two pilot projects, including monitored results, using site-specific or non-standard operational provisions. This is needed in order to test and evaluate site specific analysis tools and methods of analysis and create in guidelines or regulations based on these for their use by planners and regulators.

**14 CCR § 916.9 [936.9, 956.9], subsection (w) - Exemption**

The Board amended the initial proposal to change language that was incorrectly noticed. Existing rule language that was intended to be deleted was inadvertently not shown in the initial proposal (ref. Page 80, Lines 15-25 and Page 81, Lines 1-3). This language is reinserted and shown as strikeout format. Furthermore, subsections (3), (4) and (5) should be amended to contain the stipulation that the other permit “addresses anadromous salmonids” like (1) and (2).

The initial proposal contains non-logical language as a result of proposed additions and changes in this re-notice to 14 CCR 916.9.1 Protection Measures in Watersheds with Coho Salmon. 14 CCR 916.9.1 facilitates the issuance of an incidental take permit by DFG when such a permit is warranted. The issuance of an ITP can be satisfied by using 916.9.1 which, as amended, requires the use of rules under 916.9 et seq. However under 916.9 (w)(1), the provision of 916.9 et seq. do not apply when one has an ITP. This would negate the amendments of 916.9.1 which are intended to use 916.9 et seq for the issuance of an ITP.

To correct this the following introductory phrases is added to page 80 line 15 of the initial proposal: “(w) Except when expressly required by 14 CCR 916.9 [936.9, 956.9], subsections (w)(1) – (5) below,...”. This text remedies the inadvertently exclusion of the 916.9 et seq for providing rules for the issuance of an ITP in a watershed with coho salmon.

The combined changes to subsection (w) are shown below:

~~(y)(w) The provisions of 14 CCR § 916.9 [936.9, 956.9] shall not apply to a plan where there is:~~ Except when expressly required by 14 CCR 916.9 [936.9, 956.9], subsections (f)(1)-(5) below, the provisions of 14 CCR § 916.9 [936.9, 956.9] shall not apply to a plan that is subject to: an incidental take permit based upon an approved Habitat Conservation Plan that addresses anadromous salmonid protection.

(1) a valid incidental take permit issued by DFG pursuant to Section 2081(b) of the Fish and Game Code that addresses anadromous salmonid protection; or

(2) a federal incidental take statement or incidental take permit that addresses anadromous salmonid protection, for which a consistency determination has been made pursuant to Section 2080.1 of the Fish and Game Code; or

(3) a valid natural community conservation plan that addresses anadromous salmonid protection approved by DFG under section 2835 of the Fish and Game Code; or

(4) a valid Habitat Conservation Plan that addresses anadromous salmonid protection, approved under Section 10 of the federal Endangered Species Act of 1973; or

(5) project revisions, guidelines, or take avoidance measures pursuant to a memorandum of understanding or a planning agreement entered into between the plan submitter and DFG in preparation of obtaining a natural community conservation plan that addresses anadromous salmonid protection.

**14 CCR § 916.12 [936.12, 956.12], subsection (f) Section 303(d) Listed Watersheds.**

The Board amended the initial proposal to delete the proposed text and reinstate the text to 14 CCR 897 as it exist in the current FPRs. Subsection (f) as proposed is not consistent with subsections (a) through (e). The existing rules under 14 CCR § 916.12 [936.12, 956.12] provide specific direction to CAL FIRE to work with the various regional water boards to evaluate watersheds for the need for watershed specific rules to address the beneficial uses of water. The existing language under these subsections is not related to the preparation or review of any individual THP. The proposed changes to subsection (f) provide direction to an RPF preparing a THP. It is inappropriate to make this change as proposed.

**14 CCR § 923.3 [943.3, 963.3]**

The Board amended the initial proposal to update the references to FGC § 1600 on page 83, line 6 as follows:

....Exceptions may be provided through application of Fish and Game Code Sections ~~1601 and 1603~~ 1600 et seq. and shall be included in the THP.

**14 CCR § 923.3 [943.3, 963.3], subsection (a) – (d)**

The Board amended the initial proposal with two changes to 14 CCR § 923.3(a) for accuracy and to eliminate unnecessary language. The last sentence from 14 CCR § 923.3 [943.3, 963.3], subsection (a), page 83, line 8, regarding extra culverts was deleted because this language is not necessary for the RPF to fulfill the requirements of (a) and it's purpose and intent is not clear.

The word "permanent" was deleted from 14 CCR § 923.3 [943.3, 963.3], subsection (a) on page 83, line 22. All watercourse crossing locations, not just permanent watercourse crossing drainage structures, within the WLPZ should be shown on the THP map in order to comply with project disclosure requirements of CEQA, facilitate review of cumulative impacts to the watershed, and minimize delays in THP review due to additional information requests.

**14 CCR § 923.3 [943.3, 963.3], subsection (e)**

The Board amended the initial proposal to keep the existing language and delete Optional Amendment 30. Allowing exceptions to accommodating the 100-year flood flow, including debris and sediment loads, will weaken protective measures in watersheds with listed salmonids, resulting in damage to salmonid habitat. Compromising this requirement is not consistent with protection and restoration of watersheds with listed anadromous salmonids. Such exceptions could apply to crossings which have remained intact under a 10-year storm event, but which may fail catastrophically under a greater return interval storm. Channel conditions upstream of a crossing can be variable over time due to road construction, timber harvesting, bank failures, or wind throw into the channel. Such variability could cause a crossing to fail under the same return interval storm, even if it had remained intact and undamaged following stressing storms. Stressing storms, a new definition contained in the proposed rule amendments, are defines as storms yielding at least a ten-year flood flow.

Optional amendment 30 presumes that the lack of culvert-related problems in one part of the physiographic province is pertinent to the system at large rather than site-specific. In addition, it presumes that culvert related impacts are site-limited (i.e., limited to the area of the culvert that withstood a Q10 event), which is not always the case, and may in fact be the exception. Streams are linear systems that move mass and energy along the channel primarily in upstream and downstream directions and through the flood prone area in all directions. It is critical that these linkages are well understood and analyzed before any instream action is taken. Optional amendment 30 does not provide criteria for evaluating an exception such as determining the longitudinal and vertical

stability of the watercourse up- and downstream of the crossing. The term stressing storm is not accepted terminology for the concept of specific recurrence interval events. There does not seem to be a need for new terminology or jargon unique to the Forest Practice Rules when the concept of specific recurrence interval events is understood by essentially every discipline working in the stream corridor (Harrelson et al. 1994, Harvey et al. 1986, Lane 1955, Castro 2003).

#### **14 CCR § 923.3 [943.3, 963.3], subsection (g)**

The Board amended the initial proposal to delete Optional Amendment 31. Ensuring culverts are designed to be large enough in diameter and installed at a flat enough grade as to recruit natural streambed material throughout the culvert invert is critical for salmon survival. This material is needed to increase channel roughness and provide resting opportunities for anadromous salmonids during seasonal migrations of juveniles or adults. The formation of natural bedload through a culvert is a strong indicator for water depths and velocities that allow fish passage. While some stream environments may not generate enough coarse grained sediment to effectively build a bed within a culvert, this situation is acknowledged and mitigated in the Lake and Streambed Alteration Agreement for the culvert installation. This is a better way to address difficult-to-design culverts than lowering the standard for fish passage in the FPRs in watersheds with listed salmonids.

The Board amended the initial proposal in the intent of the language in the first paragraph of 14 CCR § 916.9 [936.9, 956.9], subsection (g) to be more accurate and specific on identification of “biological characteristics” on page 84, line 2, similar to the amendment for 14 CCR § 916.9 [936.9, 956.9], subsection (f)(1). The revision is shown below:

(g) ...Class I watercourses, which meet the criteria of Class I waters based on biological characteristics where fish are always or seasonally present or where fish habitat is restorable, shall....

#### **14 CCR § 923.9 [943.9, 963.9] Roads and Landings**

The Board amended the initial proposal to include Optional Amendments 33. The amendment is reasonable it provides clarity for managing roads in high environmental adverse risk areas.

The Board deleted Optional Amendment 32 as it makes more general the requirement for disclosure of road locations and offsetting mitigation measures needed for roads. As roads and crossing have been identified as a critical component to delivery of sediment, these rules are critical to ensuring adequate disclosure and review of potential impacts. The proposed language in the Option in subsection (1) does not provide a clear or enforceable standard for defining “How the operation will fit into the systematic layout pattern”.

The Board amended the initial proposal to correct inadvertent exclusion of existing rule language that was intended to be deleted but was not shown in the proposal (ref. Page 86, Lines 18-25 and Page 84, Lines 15). This language is reinserted and shown as strikeout format. Furthermore, subsections (3), (4) and (5) should be amended to contain the stipulation that the other permit “addresses anadromous salmonids” like (1) and (2).

The initial proposal contains non-logical language as a result of proposed additions and changes in this re-notice to 14 CCR § 923.9.1 Measures for Roads and Landings in Watersheds with Coho Salmon. 14 CCR § 923.9.1 facilitates the issuance of an incidental take permit by DFG when such a permit is warranted. The issuance of an ITP can be satisfied in part by using 14 CCR § 923.9.1 which, as amended, requires the use of rules under 14 CCR § 923.9 et seq. However under 14 CCR § 923.9 [943.9, 963.9] (f)(1), the provision of 14 CCR § 916.9 et seq. do not apply when one has an ITP. This would negate the amendments of 14 CCR § 923.9.1 which are intended to use 14 CCR § 923.9 [943.9, 963.9] et seq for the issuance of an ITP.

To correct this, the following introductory phrases is added to page 86 line 18 of the initial proposal: “(f) Except when expressly required by 14 CCR § 916.9 [936.9, 956.9], subsections (f)(1) – (5) below,....”. This text remedies the inadvertently exclusion of the 14 CCR § 916.9 et seq for providing rules for the issuance of an ITP in a watershed with coho salmon.

Changes above are shown below:

~~(f) The provisions of 14 CCR § 923.9 [943.9, 963.9] shall not apply to a plan where there is:~~ Except when expressly required by 14 CCR § 923.9 [943.9, 963.9], subsections (f)(1)-(5) below, the provisions of 14 CCR § 923.9 [943.9, 963.9] shall not apply to a plan that is subject to: an incidental take permit based upon an approved Habitat Conservation Plan that addresses anadromous salmonid protection.

(1) a valid incidental take permit issued by DFG pursuant to Section 2081(b) of the Fish and Game Code that addresses anadromous salmonid protection; or

(2) a federal incidental take statement or incidental take permit that addresses anadromous salmonid protection, for which a consistency determination has been made pursuant to Section 2080.1 of the Fish and Game Code; or

(3) a valid natural community conservation plan that addresses anadromous salmonid protection approved by DFG under section 2835 of the Fish and Game Code; or

(4) a valid Habitat Conservation Plan that addresses anadromous salmonid protection, approved under Section 10 of the federal Endangered Species Act of 1973; or

(5) project revisions, guidelines, or take avoidance measures pursuant to a memorandum of understanding or a planning agreement entered into between the plan submitter and DFG in preparation of obtaining a natural community conservation plan that addresses anadromous salmonid protection.

#### **14 CCR §§ 916.9.1 [936.9.1], 916.9.2 [936.9.2] and 923.9.1 [943.9.1] Protection Measures in Watersheds with Coho Salmon**

The Board amended the initial proposal to include amendments to “Protection Measures in Watersheds with Coho Salmon” and “Measures to Facilitate Incidental Take Authorization in Watersheds with Coho Salmon” and other related sections. These regulations were adopted by the Board in 2006 to implement incidental take permit issuance pursuant to DFG code 2112.

Regulatory consistency is essential between rules adopted by the Board and DFG. Consistency ensures adequate protection for the species, clarity for the regulated public, and elimination of redundant and or conflicting rules. The Board's proposed rules, when adopted consistent with the recommendations in June 18<sup>th</sup>, 2009 joint CAL FIRE and DFG letter, has been indicated by the Department of Fish and Game to be suitable for regulations jointly adopted by DFG and the Board in 2006 for “Protection Measures in Watersheds with Coho Salmon” noted above. Should the Board adopt the recommendations in the joint letter, the amendments shown to the “Coho Salmon Incidental Take Assistance” rules in 14 CCR §§ 916.9.1 [936.9.1], 916.9.2 [936.9.2], and 923.9.1 [943.9.1], could be made.

#### **ADDITIONAL TECHNICAL DOCUMENTS RELIED UPON**

The ISOR published on May 8, 2009, is amended to incorporate technical documents relied upon that were brought forward to the Board during public hearings and considered by the Board as part of the regulation adoption process. The documents supplement previous information submitted to the Board and referenced in the Initial Statement of Reasons. The documents are on file in the official rulemaking file located at



California Department Forestry and Fire Protection, Room 1506-17, 1416 9<sup>th</sup> Street, Sacramento, CA. (Numbering is continued from ISOR).

140. Benda, L.E., P. Bigelow, and T.M. Worsley. 2002. Recruitment of wood to streams in old-growth and second-growth redwood forests, northern California, U.S.A. *Can. J. For. Res.* 32: 1460–1477
141. Brown, G.W. 1980. Forestry and water quality. Oregon State University Book Stores, Inc. School of Forestry. Oregon State University, Corvallis, OR. 124 p.
142. Cafferata, P.H. 1990. Temperature regimes of small streams along the Mendocino Coast. California Department of Forestry, Fort Bragg, CA. Jackson Demonstration State Forest Newsletter. October 1990. 39: 1-4. Available at: <http://www.fs.fed.us/psw/publications/4351/Cafferata90.pdf>
143. CGS (California Geological Survey). 2002. California geomorphic provinces. Note 36. California Department of Conservation. Sacramento, CA. 4 p. Available at: [http://www.consrv.ca.gov/CGS/information/publications/cgs\\_notes/note\\_36/note\\_36.pdf](http://www.consrv.ca.gov/CGS/information/publications/cgs_notes/note_36/note_36.pdf)
144. Gomi, T., R. D. Moore, and A. S. Dhakal (2006), Headwater stream temperature response to clear-cut harvesting with different riparian treatments, coastal British Columbia, Canada, *Water Resources Research*, 42, W08437, doi:10.1029/2005WR004162.
145. Hall, J.D., C.J. Cederholm, M.L. Murphy, and K.V. Koski. 2004. Chapter 17-- Fish-forestry interactions in Oregon, Washington and Alaska, USA. Pgs. 365-388 in: T. G. Northcote and G. F. Hartman (eds.) *Fishes and Forestry -- Worldwide Watershed Interactions and Management*. Blackwell Publishing, Oxford.
146. Hunter, M.A., T. Quinn, and M.P. Hayes. 2005. Low flow spatial characteristics in forested headwater channels of southwest Washington. *Journal of the American Water Resources Association*. June. Pp. 503-516.
147. Jaeger, K.L., D.R. Montgomery, and S.M. Bolton. 2007. Channel and perennial flow initiation in headwater streams: management implications of variability in source-area size. *Environmental Management* 40:775–786. Available at: <http://duff.geology.washington.edu/grg/publications/pdfs/Jaeger.pdf>
148. Keppeler, E. T. 1998. The summer flow and water yield response to timber harvest. In: *Proceedings of the Conference on Coastal Watersheds: The Caspar Creek Story*. USDA, United States Forest Service Pacific Southwest Research Station Gen. Tech. Rep. PSW-GTR-168. pp 35-44. Available at: <http://www.fs.fed.us/psw/publications/documents/gtr-168/05keppeler.pdf>

149. Lindquist, J.L. and M. Palley. 1963. Empirical Yield Tables for Young-Growth Redwood.  
Univ. of CA Agric. Exp. Sta. Bull.
150. McArdle, R.E., W.H. Meyer, and D. Bruce. 1961. The yield of Douglas-fir in the Pacific Northwest. USDA For. Serv., Tech. Bull. No. 201. 74 p.
151. McDade, M.H., F.J. Swanson, W.A. McKee, J.F. Franklin, and J. VanSickle. 1990.
152. Source distances for coarse woody debris entering small streams in western Oregon  
and Washington. Can. J. For. Res. 20:326-330.
153. Meleason, M.A., S.V. Gregory, and J.P. Bolte. 2003. Implications of riparian management strategies on wood in streams in the Pacific Northwest. Ecological Applications 13(5): 1212-1221.
154. Meyer, W.H. 1961. Yield of even-aged stands of ponderosa pine. U.S. Dept. of Agric. Tech. Bull. 630 (rev.). 59 p.
155. MRC (Mendocino Redwood Company). 2009. Habitat Conservation Plan/  
Natural Community Conservation Plan. Chapter 8—Conservation Measures for Aquatic Habitat. Draft 5. April 2009. Ukiah, CA.
156. Moore, R.D., J.S. Macdonald, and H. Herunter. 2003. Downstream thermal recovery of headwater streams below cutblocks and logging roads. Pgs. 179-189 in: MacIsaac, E.A. (ed.) Forestry impacts on fish habitat in the northern interior of British Columbia: A compendium of research from the Stuart-Takla Fish-Forestry Interaction Study. Can. Tech. Rep. Fish. Aquat. Sci. 2509.
157. ODF (Oregon Department of Forestry). 1994. Water classification. Forest Practices Technical Note FP1. Salem, OR. 14 p. Available at:  
[http://www.oregon.gov/ODF/PRIVATE FORESTS/docs/fp/WaterClassificationFPTechNote1.pdf](http://www.oregon.gov/ODF/PRIVATE_FORESTS/docs/fp/WaterClassificationFPTechNote1.pdf)
158. Palmquist, R. 2005. Type N stream demarcation study. Phase I: Pilot results. Final Report. Washington State Cooperative Monitoring, Evaluation, and Research Committee (CMER). Olympia, WA. 61 p.
159. Rice, R.M., R.R. Ziemer, and J. Lewis. 2004. [Evaluating forest management effects on erosion, sediment, and runoff: Caspar Creek and northwestern California.](#) Pp. 223-238 in: G.G. Ice and J.D. Stednick (eds.), A Century of Forest and Wildland Watershed Lessons. Bethesda, Maryland: Society of American Foresters. Available at: <http://www.fs.fed.us/psw/publications/rice/riceSAF.pdf>

160. Sullivan, K., J. Tooley, K. Doughty, J. Caldwell, and P. Knudsen. 1990. Evaluation of prediction models and characterization of stream temperature regimes in Washington. Timber/Fish/Wildlife Report No. TFW-WQ3-90-006. Washington Department of Natural Resources, Olympia, WA.
161. Teti, P. 2006. Stream shade as a function of channel width and riparian vegetation in the BC southern interior. Streamline Watershed Management Bulletin Vol. 9/No. 2 Spring 2006. p. 10-15.
162. USEPA (United States Environmental Protection Agency). 2009. Oregon streamflow duration assessment method--Interim Version. Brian J.D. Topping, Tracie-Lynn Nadeau, Michael R. Turaski. Public Notice release date, 6 March 2009. Portland, OR. 60 p. Available at:  
[http://pebb.das.state.or.us/DSL/PERMITS/docs/osdam\\_march\\_2009.pdf](http://pebb.das.state.or.us/DSL/PERMITS/docs/osdam_march_2009.pdf)
163. Veldhuisen, C. 2000. Preliminary results and recommendations from the northwest Cascades Type4/5 stream study. Skagit System Cooperative. La Conner, WA. 6 p. Available at:  
[http://www.skagitcoop.org/documents/Veldhuisen\\_00\\_perennial\\_T45s.pdf](http://www.skagitcoop.org/documents/Veldhuisen_00_perennial_T45s.pdf)
164. WDNR (Washington Department of Natural Resources). 2005. Forest Practices Habitat Conservation Plan. Chapter 4(d). Rationale for the Plan. Olympia, WA. P. 229-248. Available at: [http://www.dnr.wa.gov/Publications/fp\\_hcp\\_14ch4d.pdf](http://www.dnr.wa.gov/Publications/fp_hcp_14ch4d.pdf)
165. Department of Forestry and Fire Protection. 2001. Soquel Demonstration State Forest. Instream Temperature Monitoring 2001. East Branch of Soquel Creek, Fern Gulch Creek and Amaya Creek. Soquel, CA.
166. Department of Forestry and Fire Protection. 2002. Soquel Demonstration State Forest. Instream Temperature Monitoring 2002. East Branch of Soquel Creek, Fern Gulch Creek and Amaya Creek. Soquel, CA.
167. Department of Forestry and Fire Protection. 2003. Soquel Demonstration State Forest. Instream Temperature Monitoring 2003. East Branch of Soquel Creek, Fern Gulch Creek and Amaya Creek. Soquel, CA.
168. Department of Forestry and Fire Protection. 2005. Soquel Demonstration State Forest. Instream Temperature Monitoring 2005. East Branch of Soquel Creek, Fern Gulch Creek and Amaya Creek. Soquel, CA.
169. Department of Forestry and Fire Protection. 2006. Soquel Demonstration State Forest. Instream Temperature Monitoring 2006. East Branch of Soquel Creek, Fern Gulch Creek and Amaya Creek. Soquel, CA.

170. Department of Forestry and Fire Protection. 2007. Soquel Demonstration State Forest. Instream Temperature Monitoring 2007. East Branch of Soquel Creek, Fern Gulch Creek and Amaya Creek. Soquel, CA.
171. Department of Forestry and Fire Protection. 2008. Soquel Demonstration State Forest. Instream Temperature Monitoring 2008. East Branch of Soquel Creek, Fern Gulch Creek and Amaya Creek. Soquel, CA.
172. County of Santa Cruz. 2009. Memorandum from Santa Cruz County Health Services Agency to Board of Supervisors, County of Santa Cruz. County log jam program. February 26, 2009. Health Services Agency Administration. Santa Cruz, CA.
173. Department of Forestry and Fire Protection. 2004. Memorandum from Sacramento Headquarters to Mr. Dave Driscoll, Region Chief, Northern Region. THP No. 1-03-173 SCR Hydrologic Review. March 15, 2004. Sacramento, CA.
174. Summer Stream Temperatures at Scotts Creek, Santa Cruz County, pre-and post-harvest (1997-2007, selectively harvested 2003); and Whitehouse Creek post-harvest (2008, selectively harvested 2008). Provided by Big Creek Forestry. April 30, 2009. Santa Cruz, CA.
175. California Regional Water Quality Control Board. 2009. Notice of public hearing for recommended modifications to the regulation of timber harvest activities in the central coast region. April 24, 2009. Central Coast Region. San Luis Obispo, CA.
176. 14 CCR 787 et seq. Incidental Take Permit Guidelines for Timber Operations. 2007.
177. California Department of Fish and Game. 2009. Presentation to the Board of Forestry and Fire Protection on example THPs and Class II watercourse delineation.
178. Fish and Game code Section 1601.6
179. California Department of Forestry and Fire Protection-California Department of Fish and Game. 2009. Joint Comment letter on Threatened or Impaired Watershed Rules, 2009. Attachment 1.
180. NOAA Fisheries, Southwest Region, Santa Rosa. 2009. Map of Geographic Scope of Proposed Anadromous Salmonid Rules , 2009.
181. American Meteorological Society (AMS). 2000. Glossary of Meteorology. 2nd edition. Allen Press. New York.

182. Bell, E., W.G. Duffy & T.R. Roelefs. 2001. Fidelity and survival of juvenile coho salmon in response to a flood. *Transactions of the American Fisheries Society* 130: 450-458.
183. Benda and Sias. 2003. *As cited in*: SWC. 2008. Scientific Literature Review of Forest Management Effects on Riparian Functions for Anadromous Salmonids. Sound Watershed Consulting. Prepared for the California State Board of Forestry and Fire Protection. September 2008.
184. Benda, L., M.A. Hassan, M. Church, and C.L. May. 2005. Geomorphology of steep-land headwaters: The transition from hillslopes to channels. *Journal of the American Water Resources Association* 41(4):835-851.
185. Beschta, R.L. et al. 1987. Stream temperature and aquatic habitat: fisheries and forestry interactions. Pp. 191-232 in *Streamside Management: Forestry and Fishery Interactions*. E.O. Salo and T.W. Cundy, eds. Contribution No. 57. College of Forest Resources, University of Washington, Seattle, Washington.
186. Biedenharn, D.S., C.R. Thorne, P.J. Soar, R. D. Hey and C. C. Watson. 2001. Effective discharge calculation guide. *International Journal of Sediment Research*. 16(4), 445-459.
187. Biedenharn, D. S., R. R. Copeland, C. R. Thorne, P. J. Soar, R. D. Hey, and C. C. Watson. 2000. Effective Discharge Calculation: A Practical Guide. Report No. ERDC/CHL TR-00-15, U. S. Army Corps of Engineers. Engineer Research and Development Center. Vicksburg, MS.
188. Bilby, R.E., J.W. Ward. 1991. Characteristics and function of large woody debris in streams draining old growth, clear-cut and second-growth forests in southwestern Washington. *Canadian Journal of Fisheries & Aquatic Sciences* 48: 2499-2508.
189. Bilby, R.E. and P.A. Bisson. 1998. Function and distribution of large woody debris. Pp. 324-346 in *River Ecology & Management: lessons from the Pacific Coastal region*. R.J. Naiman & R.E. Bilby, eds. Springer, New York.
190. Bisson, P. A. and R.E. Bilby 1982. Avoidance of suspended sediment by juvenile coho salmon. *North American Journal of Fisheries Management* 4: 371-374.
191. Bliesner, A.K. and E.G. Robison. 2007. Detecting the upstream extent of fish in the Redwood Region of Northern California. Pp 135-146 in *Proceedings of the Redwood Region Forest Science Symposium: What does the future hold?* USDA Forest Service Gen Tech. Rep. PSW-GTR-194.
192. Boyd, K. F., M. Doyle, and M. Rotar. 2000. Estimation of dominant discharge in an unstable channel environment. *Proc., 1999 International Water Resources*

Engineering Conference (CD-Rom), Environmental and Water Resources Institute, Reston, Va.

193. Braekensiek, K.E. and D.G. Hankin. 2007. Estimating overwinter survival of juvenile coho salmon in a northern California stream: accounting for effects of passive integrated transponder tagging mortality and size-dependent survival. *Transactions of the American Fisheries Society* 136: 1423-1437.
194. Bramblett, R.G., M.D. Bryant, B.E. Wright & R.G. White. 2002. Seasonal use of small tributary and mainstem habitats by juvenile steelhead, coho salmon and Dolly Varden in a southeastern Alaska drainage basin. *Transactions of the American Fisheries Society* 131: 498-506.
195. Broadmeadow, S. and T.R. Nisbet. 2004. The effects of riparian forest management on the freshwater environment: a literature review of best management practices. *Hydrology and Earth Sciences* 8(3): 286-305.
196. Brown, G.W. and J.T. Krygier. 1970. Effects of clear-cutting on stream temperature. *Water Resources Research* 6(4):1133-1140.
197. Bryant, M.D. 1983. The role and management of woody debris in west coast salmonid nursery streams. *North American Journal of Fisheries Management* 3:322-330.
198. Bustard, D.R. and D.W. Narver. 1975. Aspects of the winter ecology of juvenile coho salmon (*Oncorhynchus kisutch*) and steelhead trout (*Salmo gairdneri*). *Journal of the Fisheries Research Board of Canada* 32:667-680.
199. Cafferata, P. 1990. Watercourse temperature evaluation guide. California Department of Forestry and Fire Protection, Sacramento, CA.
200. California Board of Forestry and Fire Protection (BOF). 2009. Initial Statement of Reasons, Threatened or Impaired Watershed Rules, 2009. State Board of Forestry and Fire Protection. Published May 8, 2009. Sacramento, CA.
201. California Department of Fish and Game (CDFG). 2004. Recovery strategy for California coho salmon. Report to the California Fish and Game Commission. 595 pp. Sacramento, CA.
202. California Department of Fish and Game. 2000. Guidelines for temporary water drafting from streams and rivers supporting anadromous salmonids; special application for timber harvest activities. Draft. Sacramento, CA. August 2000.
203. California Department of Forestry and Fire Protection (CDFFP). 1990. California Mean Annual Precipitation Zones, 1900-1960. Sacramento, CA.

204. Castro, J. 2003. Geomorphologic Impacts of Culvert Replacement and Removal: Avoiding Channel Incision. U.S. Fish and Wildlife Service. Portland, OR. 19 p.
205. Cederholm, C.J., B. Houston, D.L. Cole, W.J. Scarlett, B.R Fransen, and J.W. Ward. 1997. Responses of juvenile coho salmon and steelhead to placement of large woody debris in a coastal Washington stream. *North American Journal of Fisheries Management* 17: 947-963.
206. Chamberlin, T.W., R.D. Harr, and F.H. Everest. 1991. Timber harvesting, silviculture and watershed processes. Chapter 6 in *Influences of forest and rangeland management on salmonid fishes and their habitats*. Meehan, W.R. ed. Special Publ. 19. Bethesda, MD. American Fisheries Society: 181 – 204.
207. Chen, J., J.F. Franklin, and T.A. Spies. 1995. Growing-season microclimatic gradients from clearcut edges into old-growth Douglas-fir forests. *Ecol. Applic.* 5(1):74-86.
208. Chen, J., S.C. Saunders, T.R. Crow, R.J. Naiman, K.D. Brosofske, G.D. Mroz, B.L. Brookshire, and J.F. Franklin. 1999. Microclimate in forest ecosystem and landscape ecology. *BioScience* 49(4):288-97.
209. Copeland, R.R., D. N. McComas, C. R. Thorne, P. J. Soar, M.M. Jonas, and J. B. Fripp. 2001. Hydraulic Design of Stream Restoration Projects. Technical Report ERDC/CHL TR-01-28, U.S. Army Corps of Engineers. Engineer Research and Development Center. Vicksburg, MS.
210. Crouse, M.R., C.A. Callahan, K.W. Malueg, S.E. Dominguez. 1981. Effects of Fine Sediments on Growth of Juvenile Coho Salmon in Laboratory Streams. *Transactions of the American Fisheries Society* 110: 281-286.
211. Cummins, K.W. and M.W. Wilzbach. 2006. The inadequacy of the fish-bearing criterion for stream management. *Aquatic Sciences* 67: 486-491.
212. Dolloff, C.A. 1986. Effects of stream cleaning on juvenile coho salmon and Dolly Varden in southeast Alaska. *Transactions of the American Fisheries Society*, 115:743-755.
213. Doyle, M.W., K.F. Boyd, and P.B. Skidmore. 1999. River restoration channel design: back to the basics of dominant discharge. Second International Conference on National Channel Systems, Ministry of Natural Resources, Ontario. Petersborough, Ontario.
214. Ebersole, J.L., P.J. Wigington, J.P. Baker, M.A. Cairns, M.R. Church, B.P. Hanson, B.A. Miller, H.R. LaVigne, J.A. Compton, S.G. Leibowitz. 2006. Juvenile coho salmon growth and survival across stream network seasonal habitats. *Transactions of the American Fisheries Society* 135: 1681-1697.



215. Elliot, S.T. 1986. Reduction of a Dolly Varden population and macrobenthos after removal of logging debris. *Transactions of the American Fisheries Society* 115:392-400.
216. Emmett, W.W. and M.G. Wolman. (2001). Effective discharge and gravel-bed rivers. *Earth Surface Processes and Landforms*, 26, 1369-1380.
217. Federal Interagency Stream Restoration Working Group. 1998. Stream corridor restoration: principles, processes and practices. National Technical Information Service. U.S. Department of Commerce. Springfield, Virg.
218. Floerke, R.W. 2006a. California Department of Fish and Game Memorandum: "Focused Pre-Harvest Inspection Report for the "7-Mile Springs" Timber Harvesting Plan, 1-06-188 MEN". December 19, 2006. Northern Region. Ft. Bragg, CA.
219. Floerke, R.W. 2006b. California Department of Fish and Game Memorandum: "Focused Pre-Harvest Inspection Report for the "Big Cat Crossing" Timber Harvesting Plan, 1-06-138 MEN". September 8, 2006. Northern Region. Ft. Bragg, CA.
220. Flosi, G., S. Downie, J. Hopelain, M. Bird, R. Coey and B. Collins. 1998. California Salmonid Stream Habitat Restoration Manual, 3<sup>rd</sup> edition. California Department of Fish and Game. Inland Fisheries Division. Sacramento, CA.
221. Gale, D. 2008. Coho salmon use of off-channel habitat in the lower Klamath River. Paper presented at 27th Salmonid Restoration Conference, March 4-7, 2008. Santa Cruz, CA.
222. Giannico, G. and S.G. Hinch. 2003. The effect of wood and temperature on juvenile coho salmon winter movement, growth, density and survival in side-channels. *River Research & Applications* 19: 219-231.
223. Gomi, T., R.C. Sidle, and J.S. Richardson. 2002. Understanding processes and downstream linkages of headwaters systems. *BioScience* 52:905-916.
224. Gregory, S.V and P.A. Bisson. 1996. Degradation and loss of anadromous salmonid habitat in the Pacific Northwest. Pp 277-314 in *Pacific Salmon and Their Ecosystems*. D.J. Stouder et al. eds. Chapman & Hall.
225. Grette, G.B. 1985. The role of large organic debris in juvenile salmonid habitat in small streams in second-growth and unlogged forests. M.S. thesis, University of Washington, Seattle.
226. Harrelson, C.C., C.L. Rawlins, and J.P. Potyondy. 1994. Stream Channel Reference Sites: An Illustrated Guide to Field Technique. General Technical Report



RM-245. U.S. Department of Agriculture, Forest Service. Rocky Mountain Forest and Range Experiment Station. Fort Collins, CO.

227. Harvey, M.D. and C.C. Watson. 1986. Fluvial processes and morphological thresholds in incised channel restoration. *Water Resources Bulletin*, 22(3):359-368.
228. Heifetz, J., M.L. Murphy, K.V. Koski. 1986. Effects of logging on winter habitat of juvenile salmonids in Alaskan streams. *North American Journal of Fisheries Management* 6: 52-58.
229. Henning, J.A., R.E. Greswell and I.A. Fleming. 2006. Juvenile salmonid use of freshwater emergent wetlands in the floodplain and its implications for conservation management. *North American Journal of Fisheries Management* 26:367-376.
230. Henning, J.A., R.E. Greswell and I.A. Fleming. 2007. Use of seasonal freshwater wetlands by fishes in a temperate river floodplain. *Journal of Fish Biology* 71: 476-492.
231. Hey, R. D. 1975. Design discharge for natural channels. Pp. 73–88 in *Science, technology and environmental management*. R. D. Hey and T. D. Davies, eds. Saxon House. Farnborough, England.
232. Hey, R. D. (1994). Restoration of gravel-bed rivers: Principles and practice. *“Natural” channel design: Perspectives and practice*, Canadian Water Resources Association, Cambridge, Ont., 157–173.
233. Hicks, B. J., J.D. Hall, P.A. Bisson, and J.R. Sedell. 1991. Responses of salmonids to habitat changes. Pp. 483-518 in *Influences of forest and rangeland management on salmonid fishes and their habitats*. Special Publ. 19. Meehan, W.R. ed. American Fisheries Society. Bethesda, MD.
234. Higgins, C.G. 1984. Piping and sapping: development of landforms by groundwater outflow. Pg. 18-58 in *Groundwater as a Geomorphic Agent*. R.G. LaFleur ed. Allen and Unwin. New York.
235. Horton, R.E. 1945. Erosional developments of streams and their drainage basins: hydrophysical approach to quantitative morphology. *Geological Society of America, Bulletin* v.56, pp. 275-370.
236. J. L. Meyers, L.A. Kaplan, D. Newbold, et al. 2003. *Where Rivers are Born: The Scientific Imperative for Defending Small Streams and Wetlands*. American Rivers, the Sierra Club Foundation and the Turner Foundation. Pgs. 23. Washington, DC.
237. Jeffres, C.A., J.J. Opperman, P.B. Moyle. 2008. Ephemeral floodplain habitats provide best growth conditions for juvenile Chinook salmon in a California river. *Environmental Biology of Fishes* 83: 449-458.

238. Kauffman, J.B., R.L. Beschta, N.Otting and D. Lytjen. 1997. An ecologic perspective of riparian and stream restoration in the Western United States. *Fisheries* 22(5): 12-24.
239. Lane, E.W. 1955. Design of stable alluvial channels. *Transactions, American Society of Civil Engineers* 120(2776):1234-1260.
240. Lisle, T.E. 1986. Effects of woody debris on anadromous salmonid habitat, Prince of Wales Island, southeast Alaska. *North American Journal of Fisheries Management* 6: 538-550.
241. Macedo, R.A. 1992. Evaluation of side-channels for increasing rearing habitat of juvenile salmonids. M.S. Thesis, Humboldt State Univ., Arcata, CA. 148 pp.
242. Madej, M.A., C. Currens, and J. Yee. 2006. Assessing possible thermal restrictions for coho salmon (*Oncorhynchus kisutch*) through thermal infrared and instream monitoring, Redwood Creek, California. *Canadian Journal of Fisheries & Aquatic Sciences* 63:1384–1396.
243. McNeil, W.J. and W.H. Ahnell. 1964. Success of pink salmon spawning relative to size of spawning bed materials. U.S. Fish & Wildlife Service. Special Scientific Report – Fisheries, 469.
244. Meyer, J.L. et al. 2007. The contribution of headwater streams to biodiversity in river networks. *Journal of the American Water Resources Association* 43(1): 86-103.
245. Minshall, G.W., K.W. Cummins, R.C. Peterson, [et al.]. 1985. Development in stream ecosystem theory. *Canadian Journal of Fisheries and Aquatic Sciences*. 42: 1045-1055.
246. Montana Department of Environmental Quality. 2007. Longitudinal field methodology for the assessment of TMDL sediment and habitat impairments. Montana Department of Environmental Quality. June 2007. Helena, MT. 29 pp. Available at [http://www.bluewatertaskforce.org/documents/Sediment-Field-Methods\\_22.pdf](http://www.bluewatertaskforce.org/documents/Sediment-Field-Methods_22.pdf).
247. Morley, S.A., P.S. Garcia, T.R Bennett and P. Roni. 2005. Juvenile salmonid (*Oncorhynchus* spp.) use of constructed and natural side channels in Pacific Northwest rivers. *Canadian Journal of Fisheries & Aquatic Sciences* 62: 2811-2821.
248. Murphy, M.L., J. Heifetz, S.W. Johnson, [et al.]. 1986. Effects of clear-cut logging with and without buffer strips on juvenile salmonids in Alaskan streams. *Canadian Journal of Fisheries & Aquatic Sciences* 43: 1521-1533.

249. Murphy, M.L., K.V. Koski. 1989. Input and depletion of woody debris in Alaska streams and implications for streamside management. *North American Journal of Fisheries Management* 9: 427-436.
250. Naiman, R.J. and J.J. Latterrell. 2005. Principles for linking fish habitat to fisheries management and conservation. *Journal of Fish Biology* 67(Supplement B), 166-185.
251. National Marine Fisheries Service (NMFS). 2001. Water drafting specifications. Southwest Region. Long Beach, CA. August 2001.
252. National Oceanic and Atmospheric Administration (NOAA). 2009a. Recovery Plan for the Evolutionary Significant Unit of Central California Coast Coho Salmon. National Marine Fisheries Service. Southwest Region. In preparation.
253. National Oceanic and Atmospheric Administration (NOAA). 2009b. Recovery Plan for the Evolutionary Significant Unit of Southern Oregon Northern California Coast Coho Salmon. National Marine Fisheries Service. Southwest Region. In preparation.
254. Nickelson, T.T., J.D. Rodgers, S.L. Johnson, M.F. Solazzi. 1992. Seasonal changes in habitat use by juvenile coho salmon (*Oncorhynchus kisutch*) in Oregon coastal streams. *Canadian Journal of Fisheries & Aquatic Sciences* 49: 783-789.
255. Noss, R.F., L. Benda, T. Hamer, J. McBride, T. Roelofs, T. Sholars, and B. Ziemer. 2003. Report of Science Advisors: Mendocino Redwood Company Natural Community Conservation Plan Habitat Conservation Plan. Unpubl. Rept. 64 p.
256. P. Cafferata, T. Spittler, M. Wopat, G. Bundros, and S. Flanagan. 2004. California Forestry Report No.1. Designing watercourse crossings for passage of 100-year flood flows, wood and sediment. California Department of Forestry and Fire Protection. Sacramento, CA. 39 p.
257. Pollock, M.M., and P.M. Kennard. 1998. A low-risk strategy for preserving riparian buffers needed to protect and restore salmonid habitat in forested watersheds of Washington State. 10,000 Years Institute. Bainbridge Island, WA.
258. Pollock, M.M., G.R. Pess, T.J. Beechie and D.R. Montgomery. 2004. The importance of beaver ponds to coho salmon production in the Stillaguamish River basin, Washington, USA. *North American Journal of Fisheries Management* 24:749-760.
259. Pusey, B.J. and A.H. Arthington. 2003. Importance of the riparian zone to the conservation and management of freshwater fish. *Marine and Freshwater Research* 54:1-16.

260. Ransom, B.O. 2007. Extended freshwater rearing of juvenile coho salmon (*Oncorhynchus kisutch*) in northern California streams. M.S. thesis, Humboldt State University. Arcata, CA.
261. Rantz, S. 1972. Mean annual precipitation in the California region. U.S. Geological Survey. Open-File Map. Menlo Park, CA.
262. Rantz, S.E., 1969, Mean annual precipitation in the California region: U.S. Geological Survey Open-File Map.
263. Rapp, C.F., R.G. Shorelands, and T.B. Abbe. 2003. A Framework for Delineating Channel Migration Zones. Washington State Department of Ecology, Final Draft Publication #03-06-027. 135 p.
264. Reeves, G.H., F.H. Everest, and J.R Sedell. 1993. Diversity of juvenile anadromous salmonid assemblages in coastal Oregon basins with different levels of timber harvest. Transactions of the American Fisheries Society 122: 309-317.
265. Reeves, G.H., K.M. Burnett and E.V. McGarry. 2003. Sources of large wood in the mainstem of a fourth order watershed in Oregon. Canadian Journal of Forest research 33: 1363-1370.
266. Reeves, G.H., L.E. Benda, K.M Burnett., P.A Bisson and J.R. Sedell, 1995. A disturbance-based ecosystem approach to maintaining and restoring freshwater habitats of evolutionarily significant units of anadromous salmonids in the Pacific Northwest. Pp. 334-349 in Evolution and the aquatic ecosystem: defining unique units in population conservation. J.L. Nielsen, ed. American Fisheries Society Symposium 17. Bethesda, Maryland.
267. Reeves, G.H. 2006. The Aquatic Conservation Strategy of the Northwest Forest Plan: An Assessment after 10 years. Chapter 9 in: Northwest Forest Plan – The First 10 Years (1994-2003): Synthesis of Monitoring and Research Results. U.S. Dep. Agriculture, Forest service. General tech Rep. PNW-GTR-651.
268. Richardson, J.S. and R.J. Danehy. 2007. A synthesis of the ecology of headwater streams and their riparian zones in temperate forests. Forest Science 53(2):131-147.
269. Riley, A. L. 1998. Restoring streams in cities: A guide for planners, policymakers, and citizens. Island Press. Washington, D.C.
270. Roni, P., T.P. Quinn. 2001. Density and size of juvenile salmonids in response to placement of large woody debris in western Oregon and Washington streams. Canadian Journal of Fisheries & Aquatic Sciences: 58: 282-292.

271. Roni, P., S.A. Morley, P. Garcia, C. Detrick, D. King and E. Beamer. 2006. Coho salmon smolt production from constructed and natural floodplain habitats. *Transactions of the American Fisheries Society* 135: 1398-1408.
272. Rosenberg, R.J., B.L. Blad, and S.B. Verma. 1983. *The Biological Environment*. John Wiley and Sons. New York.
273. Rosenfeld, J.S., E. Raeburn, P.C. Carrier and R. Johnson. 2008. Effects of side channel structure on productivity of floodplain habitats for juvenile coho salmon. *North American Journal of Fisheries Management* 28: 1108-1119.
274. Roy, D.F. 1966. Silvical characteristics of redwood (*Sequoia sempervirens* [D. Don] Endl.). Res. Paper PSW-RP-28. Berkeley, CA: Pacific Southwest Forest & Range Experiment Station Forest Service. U. S. Department of Agriculture; 20 p.
275. Russell, W.H., and C. Jones. 2001. The effects of timber harvesting on the structure and composition of adjacent old-growth coast redwood forest, California, USA *Landsc. Ecol.* 16: 731-41.
276. Schumm, S.A., M.D. Harvey, and C.C. Watson. 1984. *Incised channels: morphology, dynamics and control*. Water Resources Publications. Littleton, CO.
277. Shaffer, K.E. and W.F. Laudenslayer. 2006. Fire and Animal Interactions. In *Fire in California's Ecosystems*. Sugihara, N.G., J.W. Van Wagtendonk, K.E. Shaffer, J. Fitees-Kaufman, and A.E. Thode, eds. University of California Press.
278. Soar, P.J. 2000. *Channel Restoration Design for Meandering Rivers*. Unpublished PhD Thesis, School of Geography. University of Nottingham. Nottingham, U.K., 409 pp.
279. Solazzi, M.F., T.E. Nickolson, S.L. Johnson and J.D. Rodgers. 2000. Effects of increasing winter rearing habitat on abundance of salmonids in two Oregon coastal streams. *Canadian Journal of Fisheries & Aquatic Sciences* 57(5): 906-914.
280. Sommer, T.R., M.L. Nobriga, W.C. Harrell, W. Batham and W.J. Kimmerer. 2001. Floodplain rearing of juvenile chinook salmon: evidence of enhanced growth and survival. *Canadian Journal of Fisheries & Aquatic Sciences* 58(20): 325-333.
281. Sommer, T.R., W.C. Harrell, and M.L. Nobriga. 2005. Habitat Use and Stranding Risk of Juvenile Chinook Salmon on a Seasonal Floodplain. *North American Journal of Fisheries Management* 25(4): 1493-1504.
282. Stacey, G.B. 2007. California Department of Fish and Game Memorandum: "Pre-Harvest Inspection Report for the Road 13500 Timber Harvesting Plan, 1-07-075MEN", July 3, 2007. Northern Region. Ft. Bragg, CA.

283. Strahler, A.N. 1952. Hypsometric (area-altitude) analysis of erosional topography. *Bulletin Geological Society of America*. 63: 1117-1142.
284. Strahler, A.N. 1964. Quantitative geomorphology of drainage basins and channel networks. In *Handbook of Applied Hydrology*. Ven Te Chow, ed. McGraw Hill, New York. Pp. 4-39.
285. Sullivan, K., D.J. Martin, R.D. Cardwell, J.E. Toll, and S. Duke. 2000. An analysis of the effects of temperature on salmonids of the Pacific Northwest with implications for selecting temperature criteria. Sustainable Ecosystems Institute, Portland Oregon.
286. Sullivan, K.; Lisle, T.E.; Dolloff, C.A. [et al.]. 1987. Stream channels: the link between the forests and fishes. Pp. 39-97 in *Streamside management: forestry and fishery interactions*. Contrib. 57. Salo, E.O. and T.W.Cundy, eds. Institute of Forest Resources. University of Washington. Seattle, WA.
287. Swales, S. & C.D. Levings. 1989. Role of off-channel ponds in the life-cycle of coho salmon (*Oncorhynchus kisutch*) and other juvenile salmonids in the Coldwater River, British Columbia. *Canadian Journal of Fisheries & Aquatic Sciences* 46: 232-242.
288. T. Dunne and L. Leopold. 1978. *Water in environmental planning*. W.H. Freeman and Co. New York. Pgs 67-73.
289. Thode, A.E., J.L. Kershner, K. Roby, L.M. Decker, and J.L. Beyers. 2006. Fire, watershed resources, and aquatic ecosystems. In *Fire in California's Ecosystems*. Sugihara, N.G., J.W. Van Wagtendonk, K.E. Shaffer, J. Fitees-Kaufman, and A.E. Thode, eds. University of California Press.
290. Thomas, J.W., and 97 others. 1993. *Forest ecosystem management: an ecological, economic, and social assessment*. US Depart. Agriculture, For. Serv.; US Depart. Commerce, Nat. Oceanic Atmospheric Admin. & Nat. Mar. Fish. Serv.; US Depart. Interior, Bur. Land Manage., Fish & Wildl. Serv., Nat. Park Serv.; and Env. Prot. Agency. US Gov. Printing Off: 1993-793-071. IX-24 [1993 FEMAT].
291. Thorne, C.R., R. G. Allen, and A. Simon. 1996. Geomorphological river channel reconnaissance for river analysis, engineering and management. *Trans. Inst. British Geography*, 21, 469-483.
292. Topping, B.J.D., T.L. Nadeau, and M.R. Turaski. 2009. Oregon streamflow duration assessment method interim version. United States Army Corps of Engineers. Public Notice release date, 6 March 2009. 60 p. Portland, OR.
293. Tschapalinski, P.J. and G.F. Hartman. 1983. Winter distribution of juvenile coho salmon (*Oncorhynchus kisutch*) before and after logging in Carnation Creek, British

Columbia, and some implications for overwinter survival. *Canadian Journal of Fisheries & Aquatic Sciences* 40(4):452-461.

294. Vannote, R.L., G.W. Minshall, K.W. Cummins [et al]. 1980. The river continuum concept. *Canadian Journal of Fisheries & Aquatic Sciences* 37:130-137.
295. W.E. Wilson and J.E. Moore. 1998. Glossary of hydrology. Wilson, W.E. and J.E. Moore, eds. American Geological Union. Virginia. 249 p.
296. Waananen, A.O., and J.R. Crippen. 1977. Magnitude and frequency of floods in California: U.S. Geological Survey Water-Resources Investigations Report 77-21. 96 p.
297. Welsch, D.J. 1991. Riparian forest buffers. NA-PR-01-91. Radnor, PA: U.S. Department of Agriculture, Forest Service, Northeastern Area State and Private Forestry. 20 p.
298. Welsh, H.H. Jr., G. R. Hodgson, and B. C. Harvey. 2001. Distribution of juvenile coho salmon in relation to water temperatures in tributaries of the mattole river, california. *Transactions of the American Fisheries Society* 21: 464-470.
299. Wharton, G., N.W. Arnell, K.J. Gregory, and A.M Gurnell. 1989. River discharge estimated from channel dimensions. *J. Hydrol.* 106:365–376.
300. Wigington, P.J. et al. 2006. Coho salmon dependence on intermittent streams. *Front. Ecolo. Environ.* 4(10): 513-518.
301. Williams, G. P.(1978. Bankfull discharge of rivers. *Water Resources Research*, 14(6), 1141-1480.
302. Wipfli, M.S. and D.P. Gregovich. 2002. Export of invertebrates and detritus from fishless headwater streams in southeastern Alaska, USA. *Can J. Fish. Aquat. Sci.* 54: 1259-1269.
303. Wipfli, M.S. 1996. Terrestrial invertebrates as salmonid prey and nitrogen sources in streams: contrasting old-growth and young-growth riparian forests in southeastern Alaska, USA. *Canadian Journal of Fisheries & Aquatic Sciences* 54: 1259-1269.
304. Wipfli, M.S. 2005. Trophic linkages between headwater forests and downstream fish habitats: implications for forest and fish management. *Landscape & Urban Planning* 72:205-213.
305. Wipfli, M.S. and D.P. Gregovich. 2002. Export of invertebrates and detritus from fishless headwater streams in southeastern Alaska, USA. *Canadian Journal of Fisheries and Aquatic Sciences* 54: 1259-1269.

306. Wolman, M. G. and J. P. Miller. 1960. Magnitude and frequency of forces in geomorphic processes. *Journal of Geology*, 68, 54-74.
307. Young, K.A., S.G. Hinch, and T.G. Northcote. 1999. Status of resident coastal cutthroat trout and their habitat twenty-five years after logging. *North American Journal of Fisheries Management* 19: 901-911.
308. Ziemer, R. R. and J. S. Albright. 1987. USDA Forest Service, Pacific Southwest Forest and Range Experiment Station, Erosion and Sedimentation in the Pacific Rim (proceedings of the Corvallis Symposium, August 1987); IAHS Publ. no. 165.

## **CONTACT PERSON**

Requests for copies of the proposed text of the regulations, the *Initial Statement of Reasons*, modified text of the regulations and any questions regarding the substance of the proposed action may be directed to:

Christopher Zimny  
Regulations Coordinator  
California Department of Forestry and Fire Protection  
P.O. Box 944246  
Sacramento, CA 94244-2460  
(916) 653-9418

The designated backup person in the event Mr. Zimny is not available is Doug Wickizer, California Department of Forestry and Fire Protection, at the above address and phone number (916) 653-5602.

## **AVAILABILITY OF STATEMENT OF REASONS AND TEXT OF PROPOSED REGULATIONS**

The Board has prepared an *Initial Statement of Reasons* providing an explanation of the purpose, background, and justification for the proposed regulations. The statement is available from the contact person on request.

When the *Final Statement of Reasons* has been prepared, the statement will be available from the contact person on request.

A copy of the express terms of the original proposed action using UNDERLINE to indicate an addition to the California Code of Regulations and ~~STRIKETHROUGH~~ to indicate a deletion is also available from the contact person named in this notice.



The Board will have the entire rulemaking file, including all information considered as a basis for this proposed regulation, available for public inspection and copying throughout the rulemaking process at the following address:

California Department of Forestry and Fire Protection  
Resources Building  
Room 1517  
1416 9<sup>th</sup> St.  
Sacramento, CA 94816  
Attention: Christopher Zimny  
Tel: (916) 653-9418

**All of the above referenced information is also available on the Board website:**

<http://www.fire.ca.gov>

#### **AVAILABILITY OF CHANGED OR MODIFIED TEXT**

After holding the hearing and considering all timely and relevant comments received, the Board may adopt the proposed regulations substantially as described in this notice. If the Board makes modifications which are sufficiently related to the originally proposed text, it will make the modified text—with the changes clearly indicated—available to the public for at least 15 days before the Board adopts the regulations as revised. Changes made to the text notice in the 45-Day notice of rulemaking on May 8, 2009, have been modified in this 45 Day Notice of Rulemaking Modification. The changes are clearly indicated as follows:

Existing CCR Text ----- No underline or strikethrough

Deletion of text made in the 45-Day Notice published on 5/8/09 -- ~~single strikethrough~~

Additions of text made in the 45-Day Notice published on 5/8/09 ----- single underline

Deletions of text made in the 45-Day Notice published on 7/24/09 ---- ~~double strikethrough~~

Additions of text made in the 15-Day Notice published on 7/24/09 ----- double underscore

Notice of the comment period on changed regulations, and the full text as modified, will be sent to any person who:

- a) testified at the hearings,
- b) submitted comments during the public comment period, including written and oral comments received at the public hearing, or

c) requested notification of the availability of such changes from the Board.

A copy of the express terms of the modifications of the originally proposed action using DOUBLE UNDERLINE to indicate an addition to the California Code of Regulations and ~~DOUBLE STRIKETHROUGH~~ to indicate a deletion is also available from the contact person named in this notice.

Requests for copies of the modified text of the regulations may be directed to the contact person listed in this notice. The Board will accept written comments on the modified regulations for 45 days after the date on which they are made available.

***/s/ Christopher Zimny***

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Christopher Zimny  
Regulations Coordinator  
California Department of Forestry and Fire Protection